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Spanish Socialists Sweep Elections

Calvo Sotelo Promises Stability Until González Assumes Power

By R.W. Apple Jr.

New York Times Service

MADRID — Prime Minister Leopoldo Calvo Sotelo, who lost his own seat as his party was defeated in Thursday's general election, promised Friday that he would allow no power vacuum to develop in Spain while the country awaits a new Socialist government.

Headed by 40-year-old Felipe González, the Socialist Party won a sweeping and historic victory in the election, gaining a clear majority in the 350-member Congress.

Mr. Calvo Sotelo will lead a caretaker government until early December, when Mr. González will be sworn in as leader of the first leftist Spanish government since the end of the civil war in 1939. His comment was made in response to those who have suggested that dissident elements in the army, which have often sought to impose their will during past transition periods, would strike next month.

Meanwhile, Mr. González, who has been in the spotlight since his smashing victory in private, speaking by telephone with King Juan Carlos, who is seen here as the guarantor of Spanish democracy, but making no public appearance.

The Socialists, who spent 40 years in exile and opposition under the rigid dictatorship of Franco, achieved under Mr. González's

leadership nothing less than a reversal, however transitory, of the outcome of the civil war.

Their landslide victory transformed Spain into a two-party state, with voters rejecting not only the fringe parties on the right and left but also the Union of the Democratic Center, which has governed Spain for the last five years.

"For better or for worse, we have shattered the last links with the Franco system," a Spanish sociologist commented Friday.

On a memorable night in a country with a political history perhaps more turbulent than any in Western Europe, Socialists danced in the streets and caused enormous traffic jams at 4 in the morning as they drove into the center of Madrid, honking their horns and blowing whistles in an explosion of joy. Ten years ago, few had thought the Spanish left would ever win power in an election.

Contemplating the astonishing change wrought by the Socialists in the political landscape here, politicians, intellectuals and commentators wondered aloud about the reaction of the army and the prospects of stability with a weak political center. But there was no sign

of unrest, and the rightist Popular Alliance of Manuel Fraga Iribarne, the former Franco minister who staged a brilliant comeback to finish a strong second in the voting, issued a statement pledging to act as a loyal opposition party.

A spokesman for the Popular Alliance said his party hoped the Socialists would govern with the moderation they had promised and "the prudence that the present situation requires." But the 59-year-old Mr. Fraga condemned the Socialists as "inexpert people with an unworkable program" and predicted he would soon win power.

Final tentative figures issued by the Interior Ministry showed the Socialists with 46 percent of the votes to 25.3 percent for the Popular Alliance. The ministry said that the seats in the Congress, the legislative house of the Cortes, would be apportioned as follows: Socialists, 201; Popular Alliance, 106; Union of the Democratic Center, 17; Catalan Nationalists, 12; Basque Nationalists, 8; Communists, 5; and others, 6.

The Democratic Center, which won 168 seats in the last election in March 1979, was all but wiped out, losing 156 seats, including those of Mr. Calvo Sotelo, 11 other ministers and the party secretary-general, Inigo Cervera.

The Communists lost 18 of their 23 seats, faring poorly even in Barcelona, where they constituted a dominant force before and during the civil war, and in the Asturias, where the miners have a longstanding Communist tradition. They won too few seats to enable them to form a parliamentary group, which will make it hard for their veteran leader, Santiago Carrillo, to speak in debates.

Mr. González's party also gained an absolute majority in the largely ceremonial Senate, winning 134 of the 208 contests.

Spanish businessmen, apparently reassured by the moderation of the Socialist platform, which includes no promises of sweeping structural change, reacted pleasantly to Mr. González's victory, even though few of them had backed him. On the Madrid stock exchange, prices were firm. The peseta slumped to a new low of 117.55 to the dollar, but bankers blamed that more on the recent strength of the dollar than on worries about Socialism.

Mr. González has promised that "public investment will act as the economy's motor" in reducing the current unemployment level of 16 percent and cutting the annual inflation rate of 15 percent.

International reaction to Mr. González's landslide victory was equally calm. The U.S. Embassy here, which has very few close contacts with the Socialists, nonetheless maintained in a formal statement that it "looks forward to working with the new government."

But the prospect of a Socialist administration raises difficult questions for both the United States and other West European countries.

Spain became the 16th member of the North Atlantic Treaty Organization in May, but the Socialists oppose membership and have promised a referendum on the issue. They also want to renegotiate the agreement covering U.S. military bases in Spain, and they appear less inclined than the outgoing government to push aggressively for long-delayed Spanish membership in the European Community.

Alfonso Guerra, Mr. González's deputy, said early Friday morning that the negotiations concerning the integration of Spain into the NATO military command structure would be frozen immediately.

The complete election returns showed that the Socialists' sweep had been national in scope. They took at least one seat in each of the 50 provinces and in both Spanish territories in Africa, carried all eight of the biggest provinces, which elect more than a third of the deputies, and won or broke even in every province except four.



Felipe González, left, the victorious Socialist leader, acknowledged cheers early Friday morning at his election headquarters in a Madrid hotel. Sharing the limelight with him was a hotel waiter.

Scientists Duplicate Brain Chemical Tied To Growth Hormone

By Harold M. Schmeck Jr.

New York Times Service

NEW YORK — Scientists in California report they have found and artificially duplicated a long-sought brain substance that is crucial to normal human growth.

The achievement is expected to have a major impact on studies of growth and its disorders and perhaps the treatment of other important human health problems as well. The discovery is also expected to have important applications in agriculture, offering a potentially safe and efficient way of regulating the size and growth rate of domestic animals.

The substance is called GRF for growth hormone releasing factor. It is the first to be identified, and the last of four releasing factors that were predicted by scientists more than 25 years ago and have been sought in research ever since.

Because the newly identified substance is relatively simple, it is expected that large quantities may become available soon, now that its precise chemistry is known. However, it is not possible to predict when experimental use in humans can begin because such use would involve approval by the Food and Drug Administration. But laboratory experiments that could contribute to that goal have already begun.

Chemical characterization and synthesis of the growth hormone releasing factor were reported Thursday in Science magazine, by Roger Guillemin, Paul Brazeau, Peter Böhlen, Frederick Esch, Nicholas Ling and William B. Wehrenberg, all of the Salk Institute for Biological Studies, La Jolla, California.

The substance has eluded scientists for decades because it is produced naturally only in minute amounts. The research team made their discovery by harvesting the substance from an extremely rare cancer of the pancreas gland which stimulates the pituitary gland to release excessive amounts of growth hormone.

The effect of the cancer is acromegaly, an abnormal over-

growth of bony tissue caused by the effects of excessive growth hormone. Mr. Guillemin has been a pioneer in research on hormone-releasing factors that are produced in the brain. He and Andrew V. Schally of Tulane University shared a Nobel Prize in 1977 for groundbreaking studies of releasing factors. Their work was done independently of each other.

A growth hormone releasing factor closely similar to the one described in the current report has been found by another team at Salk Institute, led by Dr. Wylie Vale. It, too, was found in one of the rare pancreatic tumors that stimulate the pituitary. Details are to be published soon. Scientists believe the two newly found growth hormone releasing factors are probably versions of the same substance.

Last year, Dr. Vale's group identified one of the other long-sought brain substances. This was corticotropin releasing factor, which is believed to be a key to the body's response to stress. The two other releasing factors, discovered earlier, act on the thyroid gland and on the course of pregnancy.

GRF and the other factors are produced normally by the hypothalamus, a deep-seated part of the brain that plays important roles in regulating temperature, appetite, thirst, sleep and wakefulness, the level of sugar in the blood, salt and water in the body and even the emotions.

Each of the releasing factors has a different vital effect on the chemistry of the human body. They act by governing the activity of the body's master gland, the pituitary, a small organ attached to the base of the brain. The pituitary sends out substances, such as growth hormone, which affect the entire body.

Eventually, the newly identified substance or chemical modifications of it will probably be used in attempts to treat cases of pituitary dwarfism, caused by insufficient secretion of growth hormone.

Some specialists believe the releasing factor might also become important in research on the biology of aging.

U.S. Experts See a New Breed of Arms

By Judith Miller

New York Times Service

WASHINGTON — Nuclear weapons planners foresee a new generation of arms in which the heat, radiation, or blast effects of a nuclear explosion can be used far more selectively than existing weapons, according to scientists and administration officials.

Although the weapons are still in the conceptual stage, officials have said that a decision to proceed with development could be made in a decade or less.

The predictions were made by officials at the Pentagon, at the president's Science Advisory Office and at the Lawrence Livermore National Laboratory in California, where much of the research is being conducted. The officials said that advances in physics and computers should lead to weapons that could be used against battlefield targets or to destroy nuclear weapons aimed at the United States.

Other officials, however, expressed doubt that the concepts will result in new weapons that could protect U.S. strategic interests or population centers. They opposed the advances because they said, they are intended to boost the weapons research and development budgets of military and atomic energy laboratories. They also saw the programs as aimed at blunting public pressure for a freeze on nuclear arsenals, development and testing.

The new concepts have come to be known in nuclear weapons circles as "the third generation" of weapons. The first generation came in the late 1940s and the 1950s, when the first bombs and warheads for missiles were developed.

The second generation began in the 1960s, when compact, yet powerful warheads were developed for such missiles as the submarine-launched Polaris and the ground-based Minuteman intercontinental

missile. Much of the nuclear weapons development ever since has been directed at improving that generation of missiles.

"There are potentially broad new capabilities emerging," said George A. Keyworth 2d, President Ronald Reagan's science adviser. "There are no clear-cut systems applications yet, but we should have a better idea of what we can do in less than 10 years."

The new weapons concepts recently received an endorsement from the Senate Armed Services Committee. The panel's report on nuclear weapons programs for fiscal 1983 instructed the Energy Department, which carries out atomic weapons development and production, to develop a "deliberate, multi-year program to exploit these concepts."

Mr. Keyworth said that only a small proportion of the \$1.07 billion requested this fiscal year for weapons research and testing was being spent on third generation

concepts. But he predicted that funding for this would increase in next year's budget.

Administration officials cited "EMP bombs" as an example of the third generation weapons. These would create a large electronic magnetic pulse to knock out an enemy's communications systems. Another such weapon, they said, is the X-ray laser, in which atomic explosions would generate X-rays, which, in turn, would power a laser beam for destroying enemy missiles.

The enhanced radiation warhead, or neutron bomb, which is designed to kill battlefield personnel with radiation while minimizing the blast effects, was cited by officials as a "crude forerunner" of a third generation weapon.

Defense planners and congressional committees are currently emphasizing the application of the weapons to systems that could de-

(Continued on Page 3, Col. 4)

Soviet Aide Makes A New Assault on American Policy

By Dusko Doder

Washington Post Service

MOSCOW — A senior member of the Soviet leadership, Konstantin Chernenko, bluntly attacked the Reagan administration Friday as a group of "dangerous" politicians whose "hellish" policies could return the world to the days of the Cold War.

Mr. Chernenko, a Politburo member and President Leonid I. Brezhnev's closest adviser, hinted broadly that Moscow was increasingly wary about prospects for an improvement in its relations with Washington. He also suggested that the Soviet government may place those relations in a deep freeze for the rest of President Ronald Reagan's term.

He repeated Moscow's willingness to arrest "a further growth of tensions in Soviet-American relations."

"We stand for their normalization and improvement," he said, "and we are prepared to engage in businesslike and detailed negotiations that must, of necessity, take into account the interests of both sides."

"If, however, Washington proves unable to rise above primitive anti-communism, if it persists in its policy of threats and diktat, well then, we are sufficiently strong and we can wait. Neither

sanctions nor belittling posturing can frighten us," he said.

The remarks made at a political rally in Tiflis, the capital of Soviet Georgia, appeared to be a somewhat more strident echo of Mr. Brezhnev's speech before the command structure of the Soviet armed forces here Wednesday.

Mr. Brezhnev leader clearly forecast a new wave of weapons modernization to counter what he called an unprecedented U.S. arms buildup as he asserted that the country would spare "nothing" to keep its military forces "up to mark."

The highly unusual conference between the political and military leadership indicated that a major reassessment of Soviet security policy was under way and that the forthcoming plenum of the Soviet Central Committee was likely to approve sharp increases in the military budget for the next year.

It is said here in well informed circles that the results of the forthcoming U.S. congressional elections could play a decisive role in determining Moscow's policy toward the United States for the next two years.

According to these accounts, Soviet officials expect marginal Republican losses, especially in the House of Representatives, to prove

(Continued on Page 3, Col. 3)

Kenyan Says Polisario Won't Be at OAU Talks

By Jay Ross

Washington Post Service

NAIROBI — The long-delayed summit meeting of the Organization of African Unity will be held in Libya late next month as the result of an agreement not to have the Western Sahara representatives. Foreign Minister Robert Ouko of Kenya said Friday.

The Polisario Front guerrillas, who are fighting Morocco for control of the Western Sahara, have "reluctantly agreed to stay away from the meeting," Mr. Ouko said. The agreement resolves, at least temporarily, the continent's worst intra-African diplomatic crisis.

Mr. Ouko said in an interview with Katharine Graham, chairman of The Washington Post Co., that in a meeting in Dar es Salaam with the Polisario chairman, Mohammed Abdel Aziz, President Julius Nyerere of Tanzania had persuaded the Western Saharan delegation to absent itself from the summit.

On Thursday, Foreign Minister Salim Ahmed Salim of Tanzania brought a message from Mr. Nyerere to President Daniel Arap Moi of Kenya, disclosing the agreement to resolve the eight-month-old problem, Mr. Ouko said. A summit meeting was not possible with Western Saharan participation, he added.

The agreement means that Colonel Moamer Qadhafi of Libya will be the host in Tripoli to the 50-nation OAU. Colonel Qadhafi, with whom the United States has broken ties, will become chairman to replace Mr. Moi, who has close ties to the United States.

The immediate victor, however, was Morocco, another friend of the United States, since it had succeeded in preventing formal African recognition of the Western Sahara, a barren phosphate-rich,

sparsely populated former Spanish colony.

Morocco led a successful boycott of the OAU meeting that had originally been scheduled for August in Tripoli. The Moroccans sought the boycott because 26 African nations decided in February to admit the Polisario Front, representing Western Sahara, as the 51st OAU member.

The issue threatened to break up the OAU, dividing it along ideological and geographical lines. Polisario, which receives Soviet-made arms from Algeria, is generally supported by leftist and pro-Soviet nations.

Morocco's cause was generally supported by West African states and other countries friendly toward the United States.

An OAU meeting next month would allow Colonel Qadhafi to address the United Nations General Assembly as the leader of Africa before the session closes Dec. 18.

Colonel Qadhafi's chairmanship could strain U.S.-African ties. These relations have been coming under pressure because of the stalled U.S.-led negotiations to resolve South-West Africa from South African control as the independent Namibia. The talks have been stalled over the issue of Cuban troops in Angola.

In the interview, Mr. Ouko criticized the slow progress of the talks and disagreed with the U.S. contention that a settlement must be accompanied by the withdrawal of the estimated 15,000 to 20,000 Cuban troops.

"Kenya considers the two independent issues; they are unrelated," he said.

But by linking Cuban withdrawal to independence for Namibia, he said, "you're telling us you're not interested in solving the Namibian issue."

For China's Youth, the People's Guide to Rock and Ruin

The 'How-To' Booklet on Decadent Western Music Warns: The Blues Are Yellow and the Beat Is Bourgeois

By Christopher S. Wren

New York Times Service

BEIJING — For those ideologically tone-deaf souls who don't know a decadent song when they hear one, the editors of People's Music Press in Beijing have come to the rescue with a timely guide.

No longer need young Chinese wonder whether an alien beat is luring them, toes tapping and fingers snapping, down the ruinous road to bourgeois perdition.

A new lavender booklet, titled "How to Distinguish Decadent Songs," explains the perils of "quivering rhythm," "unruly notes" and the "unclear, loose, drunken pronunciation" peculiar to imported popular music.

The booklet's publication in June is another broadside in the propaganda war that the authorities are waging to keep young Chinese from succumbing to Western temptations. The prime targets are foreign publications, films and music decried as "huangse," which literally means "yellow" but is freely translated as "decadent, pornographic or obscene."

Last spring the Chinese government formally banned videotapes, records and cassettes with "decadent and indecent con-

tent" and promised to evaluate the artistic merit of future imports.

Some yellow contraband would be labeled blue in the West. Early this year, the police in Guangdong province raided some makeshift theaters that peasants set up to show raunchy videotapes smuggled in from Hong Kong. Video recorders must now be registered with the provincial authorities. Customs officials in Shenzhen, the special economic zone bordering Hong Kong, have reported seizing 24,000 pornographic publications since January.

The rest of the contraband, extending to rock music, merely suggests there are things more fun to do than build communism.

Chinese musical fare has improved since the Cultural Revolution, when the official hit parade was limited to such songs as "Medical Teams in Tanzania" and "The Nightsoil Collectors Are Descending the Mountain." Classical music is once again permitted.

But the lid has descended on other Western music, after a few heady years in which some bookstores were selling cassettes of songs from Hong Kong and Taiwan along with pirated American hits.

A recent visit to a bookstore on central

Wangfujing Street turned up only "Puff, the Magic Dragon" and "Che Sera Sera" on a tape cassette of English lessons. There were also some Japanese kabuki records and two cassettes of Yugoslav folk songs.

Domestic music included several revolutionary operas, such as "The Red Detachment of Women," by now on sale, and approved pop songs by Su Xiao-ming, a soprano with an artistic troupe of the Chinese Navy.

Some Chinese youths, the sort who wear bell-bottom jeans and sunglasses with the foreign label attached, affect a taste for Western rock music, but most young people find it disorienting. They much prefer the softer sounds of John Denver, the Carpenters and Peter, Paul and Mary. The Chinese are also partial to "Red River Valley," "Jingle Bells" and "Do Re Mi," from "The Sound of Music."

Even this strikes some elders as decadent. A Beijing student related that when his younger brother asked him to borrow some tapes of Peter, Paul and Mary from his classmates, their father objected, saying, "Be careful of all this love, love, love. Studying is more important."

The authorities feel threatened more by

the sentimental ballads that find their way in from Taiwan and Hong Kong. Taiwan's singing star, Teresa Teng, who is known here as Deng Lijun, is banned, though her saccharine love songs hardly seem subversive.

The musical crackdown has extended to closing a disco for foreigners in Beijing and a jazz club at the Peace Hotel in Shanghai. Last summer the police raided some private disco parties held by the children of government officials. This month a Shanghai baker got 15 days in jail and had his tape recorder confiscated for charging the equivalent of 25 cents admission to dances in his home.

But a raid on a dance at a high school here recently drew a protest from China's youth newspaper. Two policemen closed down the party celebrating China's national holiday on Oct. 1 and hauled off the schoolteacher for letting boys and girls dance together. He was released after writing two self-criticisms.

The youth newspaper complained that the police should not have interfered because the dancing helped the mental health of the pupils, enriched their extracurricular life and promoted a sense of collectiveness.

The editors of the recent guide supplied these definitions of Western musical perversion:

• Jazz is syncretized music that "forces people to accept what is unexpected, the abnormal beat." And "dancing to this kind of music is like having nervous spasms." Furthermore, "the rhythm of jazz is against the normal psychological needs of man."

• Rock of the 1950s replaced jazz with "a frenzied beat, neighing-like singing and a simple melody." Rock songs of the 1960s have even more perversion and are "intense to provoke the nerves." Further, "what they pour out is a kind of passion for the bewildering, the vague, the numb and the impetuous."

• Disco music has a minimal melody and lyrics and a "rapid beat like a war drum." The guide explained that "disco dancing is rapid and continuous leaping and twisting."

The guide concluded that popular music has no artistic value to speak of. "The reason is because it meets the needs of people's negative spiritual life in capitalist society," it said. "It also meets the needs of capitalists who make money."

INSIDE

■ Evidence is building in Poland that Communist Party hard-liners, backed by Moscow, are pushing for an even more fundamental repositioning of orthodox Communist rule. Page 2.

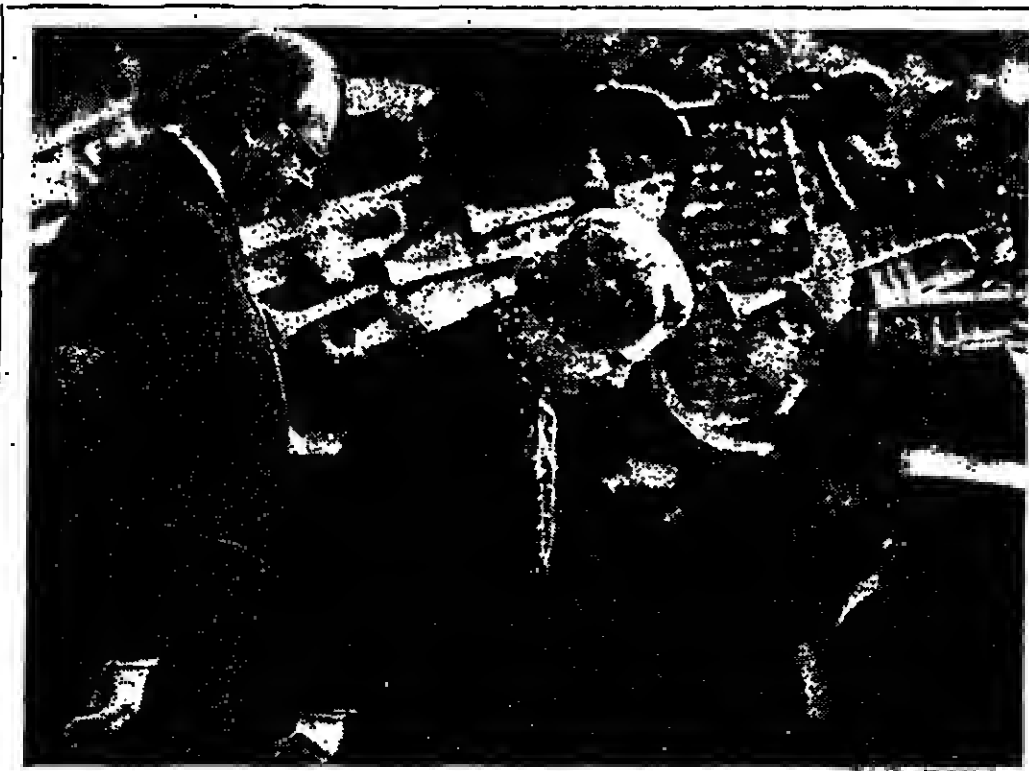
■ Japan's efforts to produce giant computers are creating concern among U.S. military planners. Page 13.

■ A growing public impression of Egypt's President Hosni Mubarak, as a "do-nothing leader" may well be a major reason he has decided to tackle the corruption issue head-on and at the highest levels. A news analysis. Page 2.

■ A special report on the development of Latin American nuclear technology appears in the Pages SS-10S.

U.S. to Put Clocks Back

The United States will return to standard time early Sunday morning, setting clocks back one hour. With the change, the Eastern United States will be five hours behind Greenwich Mean Time.



THATCHER VISITS BONN — Margaret Thatcher and Chancellor Helmut Kohl bowed to the West German flag during a welcoming ceremony Friday for the British prime minister. After talks, the two leaders flew to Berlin, and Mrs. Thatcher visited the Berlin Wall. Page 2.

Hard-Liners in Poland Pressing for Return to Orthodox Party Rule

By Dan Fisher

WARSAW — Less than a month after the formal elimination of the independent trade union Solidarity, evidence is building that Communist Party hard-liners, backed by Moscow, are pushing for an even more fundamental reimpement of orthodox Communist rule here.

The latest indication is a letter by a former party leader that alleges that, despite the crushing of Solidarity, Poland is in greater peril today than it was before martial law was introduced in December.

The letter, a copy of which was obtained Friday, warns that current government policies threaten "a new social conflict whose explosive power would be incomparably greater than the adventures of the political underground."

Written by Tadeusz Grabski, a former hard-line Politburo member, the document advocates a four-point program that it says is necessary to "save the country from self-destruction."

The program calls for final elimination of the anti-Communist underground, a revolutionary ideological purge of the party, abandonment of key elements of Poland's nascent economic reform and a crackdown on the country's Roman Catholic Church.

The letter, which is being circulated in party circles in Warsaw, echoes at least in part a theme that was prominent during a two-day meeting of the party's Central Committee that ended Thursday.

While apparently reaffirming their commitment to economic reform, the party leaders sharply criticized what they called the unjust enrichment of some elements of society as a result. Working people, they said, were indignant that some Poles were "making fortunes on the crisis."

Both the Grabski letter and statements made public by the Central Committee suggest an offensive by party hard-liners aimed

at establishing a level of central control over all aspects of Polish life unseen in a generation. The offensive follows a series of increasingly pointed public criticisms by Moscow of the Polish situation.

The Kremlin has made it clear that it finds the Polish party weak, the "counterrevolution" still threatening, the church an ever more open supporter of the political opposition and the Polish leadership disturbingly reluctant to take Soviet advice.

How these attacks reflect on General Wojciech Jaruzelski, the party and martial law leader, is unclear.

Some official sources here contend privately that General Jaruzelski is under growing political pressure and might even be forced out by some more orthodox party leader.

These sources have been telling foreign diplomats and journalists that, while it might not look that way in the West, General Jaruzelski is actually a moderate who has been battling to preserve the essence of Polish reform against the deeply entrenched, conservative party bureaucracy.

"There is no 'liberal' alternative to Jaruzelski," said a Polish journalist. "There is only a harder-line alternative."

Skeptics contend that the difference between General Jaruzelski and the hard-liners is so slim it is virtually inconsequential. They say that assertions to the contrary are intended to win for him a more sympathetic image in the West, whose financial help Poland still badly needs.

In fact, General Jaruzelski has appeared successful in removing potential hard-line rivals from positions of power. For example, Stefan Olszowski, the most prominent member of this group, was removed from the key post of Central Committee secretary in charge of ideology and propaganda last July and made foreign minister.

U.S. Magazine Barred In New Warsaw Curbs

The Associated Press

WARSAW — In its first reaction to new economic sanctions imposed by the Reagan administration, the Polish government on Friday suspended a Polish-language American magazine circulated here by the U.S. Embassy and announced its own academic sanctions on American-backed scholars.

The Polish news agency PAP said the magazine America may no longer be distributed in Poland and that all invitations to scholars by the United States must be reviewed by government officials.

Although the actions appeared to be minor, some diplomatic sources speculated that Poland could also take more serious steps, such as downgrading its relations with the United States by delaying approval of a new U.S. ambassador to Warsaw, and replacement of its envoy to the United States.

Ronald Spawowski, the Polish ambassador in Washington, defected last December to protest the imposition of martial law and has not yet been replaced.

Suspension of the magazine and tightening of academic regulations was the first step after the media denounced President Ronald Reagan's suspension of Poland's most-favored-nation trade status Wednesday in response to the outlawing of the independent union Solidarity.

The Polish government, in a series of sharp commentaries printed in Warsaw Friday, threatened retaliation because of the sanctions.

"The Polish government will consider steps it will deem proper to take in Polish-American relations and in the international forum in connection with the latest discriminatory decision by the

U.S. government," according to a statement published in all major Polish dailies.

PAP carried a new commentary later Friday charging that Mr. Reagan sought to "overthrow the social system existing in Poland as a first step in making changes of political relations in the world, advantageous to the United States."

A Western diplomatic source, who asked to comment on the Polish threats, said only, "What the Poles do is entirely predictable. Downgrading relations is as good a speculation as any, but it can't be taken as a serious possibility."

Transfer of Solidarity's Assets — The Polish government took the first step Friday toward appropriating assets of Solidarity and handing them over to new government-sponsored unions being set up across the country, Reuters reported from Warsaw.

PAP said Trade Unions Minister Stanislaw Ciosek had been ordered to draw up a timetable for transferring assets of all former unions to the new ones.

No estimate has been made of the total value of the assets of Solidarity, which employed thousands of permanent staff and maintained offices with computers, printing equipment in all major cities and large factories and companies.

The assets were frozen when martial law was declared in December and have been administered by the authorities since then. Solidarity, which had about 9.5 million members, was dissolved with all other unions when the Sejm, or parliament, passed the new trade union bill on Oct. 8.

Soviet Official Leaves Beijing After Meetings

The Associated Press

BEIJING — Leonid F. Ilyichev, the Soviet deputy foreign minister, left here Friday, apparently after making little progress in his meetings with Chinese officials in an attempt to improve Chinese-Soviet relations.

Mr. Ilyichev refused to make any comment on the talks. He was seen off at Beijing airport by Qian Qichen, the Chinese deputy foreign minister, with whom he conferred from Oct. 5 to 21. Mr. Qian also refused to make a statement.

A second round of talks is expected to be held later this year in Moscow. The discussions were the first since China suspended normalization talks in Moscow after the December 1979 Soviet intervention in Afghanistan.

The latest discussions were described "exploratory" and not a resumption of normalization or border talks. The talks were held in secret and a news blackout was imposed by both sides. No state-

ment or communiqué was issued on the conversations, which were not reported in the state-run press.

Foreign diplomatic sources said that little progress was made, but observers called it significant that the two sides had agreed to talk.

The barrier, they said, appeared to be China's insistence that several issues receive top priority in normalization efforts. China is demanding that the Soviet Union withdraw its troops from the Chinese border, the Mongolian border and from Afghanistan, and that it ends its support for Vietnam's occupation of Cambodia.

The Soviet Union apparently said that it wanted to discuss strictly bilateral matters such as trade, economic and cultural exchanges rather than third-country issues.

President Leonid I. Brezhnev said Wednesday in a speech to a Kremlin conference that Moscow wanted to normalize its relations with China and was doing everything in its power toward that end.



OPEN-ARMED WELCOME — Workers outside a Madrid department store erected a sign Friday to greet Pope John Paul II, who is expected to arrive in Spain Sunday for a 10-day visit. A message at the bottom of the billboard said "Nuestra Bienvenida" — Our Welcome.

West Hails Victory of Socialists As Proof of Democracy in Spain

Reuters

BRUSSELS — The Socialist victory in the Spanish general election was hailed throughout the world Friday as a further strengthening of democracy in Spain.

In Western Europe, officials of conservative as well as leftist governments said that they regarded the emergence of a strong, democratically elected government as more important than its political complexion.

U.S. officials, despite worries about the future Spanish government's attitude on the North Atlantic Treaty Organization, said that they were optimistic about the country's future under the Socialist leader, Felipe Gonzalez.

In Moscow, Tass expressed general satisfaction. Reporting from Madrid, Tass said that the election results were "evidence of the utter failure of the ultra-rightist forces."

European Community officials in Brussels said that the Socialist victory would make little difference in the difficult negotiations on Spain's entry into the Community. The officials noted that the Spanish Socialists were in favor of joining the EC but that objections raised by the French government over Spanish entry would still remain.

"The French Socialist govern-

ment can be expected to adopt a more conciliatory tone toward Madrid, but when it comes down to negotiating on Mediterranean farm products, Paris's stance will likely prove just as tough," a Community official said.

French officials said they were delighted at the Spanish election results and commented that it was a consolidation of a swing to the left in southern Europe over the last 18 months.

Spain's Western allies sought to play down the dangers of future military interference in the democratic process. Their firm expressions of congratulations to Mr. Gonzalez centered on reaffirming support for Spanish democracy.

In a telegram to the Socialist leader, Giovanni Spadolini, the Italian prime minister, said that the Socialist victory was a reward for a policy that defended "the ideals of justice, progress and freedom."

British officials said that the election results strengthened the democratic process. They said that they hoped the new government would move quickly to ease strains over the British colony of Gibraltar, over which Spain claims sovereignty.

In Greece, Andreas Papandreu, the Socialist prime minister, said that the election results were a sign

that socialism was sweeping through southern Europe.

In The Hague, Dutch politicians from both sides of the political spectrum welcomed the Socialist victory.

Sources close to Portugal's government, which has close links with Spain's former ruling center-right party, said that the prospect for cooperation with Spain remained good. The clear victory of the Spanish Socialists ended a long period of political uncertainty, they said.

West German Socialists hailed the results and former Chancellor Willy Brandt said that the Socialist victory was "extremely significant for Europe as a whole."

The election results were also hailed by democratic countries in Latin America. Outgoing President Jose Lopez Portillo of Mexico said that the Socialist victory would lead to even closer relations with Latin America.

The U.S. Embassy in Madrid issued a statement congratulating Mr. Gonzalez on his victory.

"Yesterday's election was a resounding indication of the voters' endorsement of the democratic process, which the United States has endorsed and will continue to support without reservation," the embassy said.

Thatcher Assails Communist System

In West Berlin, She Calls the Wall a 'Grim Monument'

By John Tagliabue

New York Times Service

BONN — Prime Minister Margaret Thatcher, on the first visit by a British government leader to West Berlin in 11 years, launched a caustic attack Friday against communism, describing the Soviet Union as a "wooden platform" to the denial of all we believe in.

Speaking at the city hall in the district of Schöneberg, where she was received by governing Mayor Richard von Weizsäcker, Mrs. Thatcher described the Berlin Wall as a "grim monument to a cruel and desolate creed."

"Every stone bears witness to the moral bankruptcy of the society it encloses," she said. Earlier in the day, she had peered at the wall from a wooden platform near Potsdamer Platz.

Widening her attack, Mrs. Thatcher called for greater Western conventional and nuclear preparedness, saying that the "wall is an ever-present reminder that those who repress the liberties of our Eastern neighbors seek also to extinguish our own."

"Let us resolve that they must never succeed," she said. The wall demonstrated, she said, that communists "flout their ruthlessness and barbarism in their desperate attempts to stop the flight to freedom."

Britain, she said, sought a reduction of East-West tensions and a balanced reduction of conventional and nuclear arms. But she said that that required a "two-way effort and greater respect for international law and human rights than we have seen in recent years."

Referring to Poland, Mrs. Thatcher said that "in every decade since the war the Soviet leaders have been reminding their pitiless ideology only survives because it is maintained by force."

She said a day would come when force would fail to contain the "anger and frustration of the people."

"Then the edifice cracks, the mortar crumbles. That is the lesson of Poland," she said.

Mrs. Thatcher's visit to the Western part of the divided city, 110 miles (170 kilometers) inside East Germany, clearly gratified her West German hosts. Bonn officials stressed in recent days that the visit, the first by a British prime minister since Edward

Heath went to West Berlin in 1971, was the highlight of Mrs. Thatcher's 24-hour trip to West Germany for regular twice-yearly consultations.

Nevertheless, some Bonn officials seemed a little uncomfortable with Mrs. Thatcher's stark words. Helmut Kohl, the new conservative chancellor who accompanied Mrs. Thatcher, alluded to a short speech to West Berlin's "stable situation," and said he hoped it would continue. He said he favored "continuing cooperation between East and West."

Soviet diplomats had already protested Mr. Kohl's presence in the city, which according to the 1971 Four Power agreement is not a constituent part of West Germany. On Thursday, Moscow's ambassador in London, Victor I. Popov, lodged a protest with the Foreign Office.

Nevertheless, Mr. Kohl was only continuing normal practice.

According to some Western officials here, the British leader's speech was seen as a signal to the Reagan administration of Europe's unimpaired resolve to oppose communist aggression. Some drew parallels to Mr. Reagan's own strongly worded democracy-versus-communism speech during his visit to Britain in June.

Officials said the differences between Europe and Washington over issues such as East-West trade ties were discussed at the meetings. In her statement Mrs. Thatcher described the differences including the controversy over the Siberian gas pipeline, as "passing problems."

In his statement, Mr. Kohl said Britain and West Germany agreed in their resolve to "eliminate misunderstandings" with Washington, in order to return to a "close relationship, while protecting our own interests."

Afrikaner Churchman Is Put Under New Ban

By Joseph Lelyveld

New York Times Service

JOHANNESBURG — The Reverend Beyers Naude, a dissident Afrikaner churchman who broke with his church and people in order to make common cause with blacks in opposition to apartheid, has been placed under a new three-year ban that makes it a crime for him to attend meetings, write for publication or be quoted anywhere in South Africa.

The ordination was delivered to him Thursday at his home in Johannesburg, just three days before the expiration of a five-year ban that he received when the government clamped down on white as well as black opposition in 1977 after the death in detention of the prominent black nationalist Steve Biko.

An interracial organization that Mr. Naude founded and headed, the Christian Institute, which was designed to mobilize opposition to the racial system within South African churches, was declared illegal at that time.

At 67, Mr. Naude is widely considered to be the most significant opponent of apartheid to have emerged among Afrikaners, the dominant white group. Although he has been silenced for five years, his influence has continued to be strongly felt in church circles, especially in the segregated nonwhite branches of the dominant Dutch Reformed Church, of which Mr. Naude was once a prominent leader.

This month a synod of the Sendkerk, or mission church, which serves the people of mixed race who are known here as coloreds,

formally accused its white mother church of heresy and idolatry for its rigid adherence to racial separation in the churches and society at large. Both by example and personal counseling, Mr. Naude is known to have been a major influence on the young clergyman, white as well as colored, who have brought the mission church to the verge of a break with the white church.

The theological and political challenge that this represents has encouraged a debate within the white church itself and, although conservative elements in the church managed to close ranks and reassert their authority at a synod that ended last week, there seems little doubt that the debate is likely to intensify in the coming months.

To the light of these developments, Mr. Naude was known to regard it as highly unlikely that the authorities would enable him to exert a direct and active influence on the course of the debate by allowing his ban to expire this week. But friends and admirers continued to urge the hope that his prestige would have some bearing on the government of Prime Minister P.W. Botha.

Mr. Naude's father was a founding member of the Broederbond, the secret society that has been regarded as a controlling influence in church affairs. For 23 years he was a member of the society, until he decided he could no longer square its practices with his Christian convictions. Finally, he decided that the only morally supportable position for a white who sought change in South Africa was to support black initiatives.

Draper Meets Begin About Pullout Talks

Israel Seeks to Include Civilians Negotiators

By Edward Walsh

JERUSALEM — Morris Draper, a U.S. special envoy, met with Prime Minister Menachem Begin and other senior Israeli officials here Friday in an effort to get negotiations started on the withdrawal of Israeli forces from Lebanon.

Draper's meetings with the Israeli officials were described as "good" and "useful," but they apparently did not produce agreement on the format for negotiations between Israel and Lebanon.

However, Israeli officials, sounding optimistic, said they hoped such an agreement would be reached by the end of next week after Mr. Draper holds more talks with Lebanese officials in Beirut.

The negotiations that Mr. Draper is attempting to arrange will focus on two issues: the withdrawal of Israeli, Syrian and Palestinian forces from Lebanon, and the establishment of a "security zone" in southern Lebanon. Israel says that such a zone must be set up before it will withdraw completely across the Lebanese border.

The forum the Israelis hope to use for the direct talks with the Lebanese is a joint military commission used last August during the negotiations for the withdrawal of the Palestine Liberation Organization forces from Beirut.

At that time, the commission included only military officers from both sides, but for new negotiations the Israelis are suggesting that the commission be expanded to include civilian political representatives of the two countries.

There reportedly is considerable opposition to that idea in Beirut. The government of President Amin Gemayel is attempting to keep its distance from Israel. Israeli officials said Friday, however, that the idea is considered "realistic" by the United States.

Mr. Draper met Friday first with the Israeli foreign minister, Yitzhak Shamir, and then spent 90 minutes with Mr. Begin, Mr. Shamir and Defense Minister Ariel Sharon.

Ararat Looks to Begin Foes

Friday's editions of the Rome newspaper La Repubblica quoted Yasser Arafat as saying his Palestine Liberation Organization is ready to talk to Israeli opponents of the Begin government, Reuters reported from the Italian capital.

But the paper said Mr. Arafat declined to confirm a senior Vatican official's recent statement that, when the PLO leader met Pope John Paul II last month, he accepted the need to recognize Israel.

"We have many friends in Israel," the paper quoted Mr. Arafat as saying. He added that a dialogue is possible with "all the men of the Peace Now movement, for example, and all those in prison for defending the need for a dialogue... between them and us."

Mr. Arafat arrived Friday in Bucharest for discussions with President Nicolae Ceausescu. In Beirut, President Hafez al-Assad of Syria was quoted Friday by the magazine An Nahar as reaffirming his insistence that Syrian troops will not withdraw from Lebanon until Israeli forces also leave the country.

U.S. Replacing Marines

U.S. marines in the international peacekeeping force in Lebanon began leaving the country Friday as part of a American troop-rotation process, United Press International reported from Beirut.

The 1,800 marines, who had served in Lebanon for a month, began moving by helicopter and landing craft to ships waiting offshore as a similar number from the 24th Marine Assault Unit moved in to replace them, witnesses said.

Trade Pact Is Set Between Australia And New Zealand

Reuters

WELLINGTON, New Zealand — Australia and New Zealand have negotiated an agreement for closer economic relations that would set up a virtual common market of the two nations' 18 million people.

The agreement was reached after all-day talks here Thursday between Prime Minister Robert D. Muldoon of New Zealand and Deputy Prime Minister J. Douglas Anthony of Australia.

The Closer Economic Relations Agreement, as it is known, will be referred to the cabinets of both governments for approval. If both cabinets endorse it, a progressive free trade zone will start operating from Jan. 1.

Neither side would give details of the new agreement, but before Thursday's talks began, the Australians were reported to be unhappy about setting 1995 as the date for New Zealand to end its import-licensing system and 1987 for abolishing export incentives.

But New Zealand had said these dates were "not negotiable." Sources said the dates remained unchanged in the agreement, but that Mr. Anthony had won some concessions for access by Australian manufacturers.

Malaysians Hunt Crocodile

Reuters

KUALA LUMPUR, Malaysia — Police sharpshooters and local medicine men have joined a hunt in the jungle of North Borneo for a 26-foot (8-meter) crocodile that has killed 11 persons and injured six, the Bernama news agency reported Friday.

A Sadat Brother Faces Trial on Corruption

By David B. Ottaway

Washington Post Service

CAIRO — President Hosni Mubarak, after a year of wavering over how to deal with widespread corruption in Egypt, has finally decided to put the brother of Anwar Sadat on trial on charges of fraud, black market dealings and a variety of other offenses.

The case of Esmat Sadat, 57, a former bus driver who became a millionaire during the presidency

of his brother, has quickly become a cause célèbre that is expected to have far-reaching repercussions on the entire Egyptian political system.

Among other things, it may lead to a clear, final break between Mr. Mubarak and the circle of Anwar Sadat's protégés and friends, who were the prime beneficiaries of the former president's "open-door," or free enterprise, policy initiated in 1974.

That is because Esmat Sadat, who is scheduled to go on trial before the Court of Ethics in early January, is expected to implicate a number of ministers and other high-ranking officials, both past and present.

The trial could easily turn into an indictment of the "open-door" policy and the Sadat regime itself. Finally, the corruption trial may serve to establish Mr. Mubarak as his own man and to boost his fading popularity among Egyptians disappointed with the lack of any substantive changes since he took office last October, after Sadat's assassination.

Mr. Mubarak has shifted in his statements about the need to clean up the corruption, which has increased since the "open-door" policy began. When he first came to power, he pledged he would not be lenient toward those found guilty. But later he played down the issue, arguing that it was no worse in Egypt than in other Arab countries and letting it be known he did not want to put the Sadat regime on trial.

Only one relatively important case has come to trial, that of a deputy in parliament, Rachad Osman, who was sentenced to a year in prison in January for illegally obtaining imported goods duty-free.

Then, on Oct. 3, Mr. Mubarak

indicated that had not forgotten his initial election pledge and hinted he was about to take action. "Law rules over everything and rises above people whoever they may be," he said in a speech to parliament.

The late Egyptian leader apparently knew that Esmat, his half brother, was using his name and kinship to promote his dealings. Sadat ordered him banned from all duty-free zones in the country as well as the port of Alexandria where he allegedly obtained imported goods to sell later at high profits on the black market.

Ibrahim Sada, editor of the daily Al-Ahram el Yom who has been a leading crusader against corruption, said the late president once asked him, "What can I do with this brother of mine?"

In an interview, Mr. Sada said he had briefed Anwar Sadat on his investigations into financial misdeeds of his brother in association with Rachad Osman.

Mr. Sada said that despite this and other evidence that Sadat knew what his brother was doing, the late president never had his brother brought to trial. He did, however, stop another half brother, Talaat Sadat, from obtaining choice land belonging to the Religious Affairs Ministry near Qubbah Palace in Cairo, according to Mr. Sada.

Mr. Sada also said in a recent column that Mr. Mubarak was instrumental in blocking an attempt by Esmat Sadat and an unnamed American partner from obtaining the contract for the shipping of U.S. arms to Egypt simply by using his name to get it and without submitting a bid in competition with other companies.

The relationship between President Sadat and his two half brothers, Esmat and Talaat, was apparently strained in the years before the assassination in 1981. According to testimony given by Esmat Sadat to the prosecutor general and published this week in the local press, he and the late president were not on speaking terms during the three years before Anwar Sadat's death.

Anwar Sadat ordered his brother arrested at one point in 1978 on charges of drug smuggling but released "under family pressure," according to the published testimony.

WORLD BRIEFS

300 Feared Dead in Nigerian Riots

LAGOS — About 300 persons are now feared to have been killed when members of a Moslem extremist sect rioted Tuesday in the northeastern city of Maiduguri, the Nigerian radio reported Friday.

The riot, broadcasting from the northern city of Kaduna and monitored in Lagos, said the rioters at Maiduguri's general hospital was full. The city remained tense, with sporadic shooting heard from the scene of the rioting in a suburb now declared a danger zone, it said.

The airport remained closed and all roads into Maiduguri, 750 miles (1,200 kilometers) from Lagos, were sealed off by heavily armed paramilitary police, the radio reported. An official statement in Lagos said the rioting began when a mob attacked police trying to arrest 16 members of the sect, which honors the late Alhaj Muhammadu Marwa as the true prophet of Islam. He was killed in riots in the northern city of Kano nearly two years ago.

Bonn Social Democrats Pick Vogel

BONN — The leaders of West Germany's opposition Social Democratic Party unanimously nominated Hans-Jochen Vogel on Friday to run for chancellor in March, the party chairman, Willy Brandt, announced.

Mr. Vogel, 56, a former justice minister and the party's leader in West Berlin, acknowledged the nomination but acknowledged that his chances of defeating Chancellor Helmut Kohl, a Christian Democrat, were not good. "I am a realist. It is not going to be an easy race. The starting position could be better," he said.

Mr. Vogel was chosen after Helmut Schmidt, who lost the chancellorship in a parliamentary vote Oct. 1, announced this week that he would not run again for health and political reasons. Mr. Vogel's nomination must be approved by a special Social Democratic congress scheduled for January in Dortmund, but party officials consider this a formality.

U.S., Russia Conclude Talks on Grain

VIENNA — The United States and the Soviet Union ended a regular consultation on grain trade Friday with little prospect of the Russians taking up any of President Ronald Reagan's offer to sell them an additional 15 million metric tons (16.5 short tons) of wheat or corn in the next six months.

"The Soviets indicated that their imports in the coming year are unlikely to exceed the past year's level, and perhaps might be noticeably less, depending upon their crop and availability of funds," Seelye G. Lodwick, U.S. undersecretary of agriculture, said at a news conference.

So far the Russians have contracted for only 1.6 million tons of U.S. grain, although they are committed under an agreement to buy at least 6 million tons.

U.K. Labor Wins 2 Special Elections

LONDON — The Labor Party, which has been struggling to overcome internal feuding and to erode the popularity of Prime Minister Margaret Thatcher, the Conservative leader, has won two special parliamentary elections.

Labor won a narrow victory Tuesday over the Conservatives to recapture the Northfield constituency of Birmingham, in the industrial Midlands. It also held its working class stronghold of Peckham, South London.

But Labor polled far fewer votes than in 1979 elections in both districts. The alliance of the Liberal Party and the Social Democrats appeared to have made the most significant gains. In Northfield, the Liberal Party won 26.3 percent of the vote, compared with 8 percent in 1979. In Peckham, the Social Democratic Party got 33 percent, compared to the Liberal Party's 8 percent in 19

OCTOBER, 1982

LATIN AMERICAN NUCLEAR TECHNOLOGY

Brazil's Crash Program Slows to Realistic Pace

By Juan de Onis

RIO DE JANEIRO — Brazil's crash program to master nuclear technology in one generation has slowed down to a more realistic pace emphasizing tangible accomplishments and consolidation.

The original plan contained in the 1975 nuclear technology transfer agreement with West Germany called for construction of eight 1,300-megawatt nuclear power stations by 1990. The completion date has been extended now to the year 2,000. This has not delayed, however, the start of the first four reactor stations, which President João Baptista de Figueiredo announced will get under way before the end of his term in 1985.

At a time of great financial difficulties in Brazil, this commitment to a nuclear program costing about \$1.2 billion annually shows a high degree of political support from the military-led administration. Paulo Nogueira Batista, a diplomat and economist who is president of NUCLEBRAS, the state company in charge of developing nuclear energy, said, "The president's support is vital for the nuclear program."

The program includes development of a complete fuel cycle based on enriched Brazilian uranium. There has been no planned delay in implementing the first stages of the fuel cycle, and there is much to show for the combined efforts of NUCLEBRAS and its West German and French partners.

Brazilian uranium prospecting has increased reserves from 11,040 metric tons (12,144 short tons) of uranium oxide in 1974 to more than 300,000 tons, and production of yellowcake, or uranium concentrate, began in May at a mine at Poços de Caldas, Minas Gerais state, that will provide 500 tons annually. The design for the sulphuric acid concentration plant came from Pechiney Ugine Kuhlmann of France, but the technique was developed in Brazil.

On Oct. 20, at Resende, west of Rio de Janeiro, a \$50-million fuel elements plant was inaugurated to make the combustion rods of zircaloy, filled with pellets of enriched uranium, that go into a reactor core. The factory, to which a uranium hexafluoride to uranium dioxide conversion plant will be added, can supply all the fuel elements for the future reactors.

Close to the fuel elements plant is another modern industrial building that holds the key to turning into an industrial reality the experimental jet nozzle enrichment system Brazil has acquired from its West German inventor. The first unit of a demonstration plant is being installed, and real testing with 288 modules for separating fissile U235 in a jet stream of uranium hexafluoride gas will begin in 1985.

The success of this process is vital for Brazil's strategy of obtaining a uranium enrichment system it controls, without depending on outside sources for the sensitive enrichment stage. The present source is URENCO, the West German-Dutch consortium, which enriches by the ultracentrifuge system. Under the contract, Brazil delivers its yellowcake and gets back an equivalent amount of enriched uranium oxide with about 3 percent U235, which is the light-water reactor fuel. The cost of one reactor fuel load is more than \$100 million.

Mr. Nogueira said that the main reason that led Brazil to conclude a nuclear technology agreement with West Germany, including the jet nozzle research, was the conviction that the United States would not provide any enrichment assistance under its policy of opposing proliferation of sensitive nuclear technology.

West Germany was attracted, in turn, by Brazil's potential as a source of uranium supply and by the commercial opportunities offered to its nuclear industry by the Brazilian reactor program. This includes not only the supply of components for the first four reactors but also substantial fee payments for engineering, licensing, manpower training and technology transfers.

In the case of the first two reactors, on which contracts have been signed, the equipment payments are about \$400 million each. The amount for software and technology transfer has not been disclosed. Wolfgang Breyer, who represents Kraftwerk Union (KWU), the main partner of NUCLEBRAS, in Brazil, said, "We don't give licenses and know-how away in Germany, but the rates are strictly commercial." The cooperation is also showing results on the industrial and construction side, after a period of frustrating delays that disrupted supply deliveries and manpower training.

At Itaipu, 50 miles (80 kilometers) south of Rio on the coast, stands a \$250-million factory for production of heavy nuclear reactor components with the most modern equipment, a trained staff, and an ideal location. Uncertainties over production schedules have kept the huge plant operating at only 200,000 man-machine hours a year since it was inaugurated in 1980, when it is capable of 500,000 man-machine hours.

With a clearer picture on the start of construction of the first four reactors, Alfredo do Amaral Osorio, director-superintendent of NUCLEP, the NUCLEBRAS subsidiary that runs the plant, said work plans for the 650 industrial workers could be expanded. Within the plant's 85,000 square meters (102,000 square yards) of building area, huge cranes roll along ceiling rails and precisely deposited forged pieces that dwarf a workman onto a movable welding platform that can simultaneously arc weld pieces up to 300 tons.

Konrad Fernstich, industrial director and one of 24 German engineers at NUCLEP, said: "This is like a German dream come true. It is the only place I know of in the world where all 15 heavy components of a reactor primary circuit are produced under one roof." The plant's first major order was the base for the (Continued on Page 6S)



BRAZILIAN POWER: Angra 2, a 1,300 megawatt reactor, is under construction by the NUCLEBRAS subsidiary NUCON at Itaipu, Brazil. The base for the reactor is in place and the containment walls are rising with 3,900 workers

on the site. In the background is Angra 1, a 628 megawatt reactor, built on a Westinghouse design, which is undergoing operational tests. Brazil began a crash program for nuclear energy in 1975, but has since slowed the pace.

Argentina, Brazil End 'Race,' Begin Cooperation

By Jorge A. Sabato

FOR MANY YEARS cooperation between Argentina and Brazil in the nuclear field was rather poor and more at research level than at the institutional one. But in May 1980 a cooperation agreement was signed and from then on it can be said that a strong linkage has been established between the Argentine and Brazilian nuclear energy programs.

The agreement is the most important signed in this field by either of the two countries. Its scope is fairly wide, covering not only the usual exchange of personnel and scientific and technical information but also the supply of Brazilian nuclear components for a 600-megawatt power reactor under construction in Argentina. It is the first time two parties suspected of being engaged in a "nuclear race" have agreed to cooperate in depth. Nothing of the same kind exists between other similar situations, such as India and Pakistan or Israel and Egypt.

Nuclear energy research and development appeared in a few Latin American countries in the middle 1950s. Atomic energy commissions modeled on similar institutions in the developed countries were set up and ambitious programs established to harness the atom for use in power production, medicine, agriculture and industry.

Now, 30 years later, practically every country in Latin America, and some in the Caribbean, is engaged in some sort of nuclear activity, though admittedly with widely varying degrees of sophistication. Eighteen nations in the region

are members of the International Atomic Energy Agency in Vienna.

Argentina and Brazil, and to a lesser degree Mexico, have by now gone far beyond the first stages of development and have important nuclear installations, including a 370-megawatt power reactor in operation in Argentina since 1974, a 625-megawatt one that has already reached criticality in Brazil and four more under construction, two in each country, as well as significant capability in several phases of the fuel cycle: uranium mining and milling, fuel-element production and even reprocessing of spent fuel. Well-trained scientific and technical personnel work at research establishments and at the industrial facilities where nuclear materials and components are manufactured.

There are some significant differences between the nuclear energy programs of each country. The main one is that while Argentina has chosen natural uranium to fuel its power reactors, Brazil's choice has been enriched uranium. Therefore, Argentina has already been able to achieve total independence in nuclear fuel supply by exploiting its own uranium ores, while Brazil will need to install a uranium enrichment facility before it can get similar independence. But being fueled by natural uranium, the Argentine power reactors require heavy water as moderator, and a unit to produce 250 tons a year is being built in the south of the country. Brazil does not need such a facility because its reactors will use light water.

Another difference lies in the way nuclear energy policy is

carried out in each country. In Argentina the full command is exercised by one institution, the Comisión Nacional de Energía Atómica, responsible for every activity in the nuclear field and which reports directly to the country's president. In Brazil the nuclear policy is executed by two agencies under the Ministry of Mines and Energy: the Comissão Nacional de Energia Nuclear, in charge of scientific research, training of personnel, safety and protection, and NUCLEBRAS, a state corporation that covers a wide range of activities, from uranium prospecting to building nuclear power reactors.

Although following rather different paths, the policies of both countries are essentially aimed at the same target, the development of an autonomous capability in the technology, production and uses of nuclear energy. Up to now the authorities in both countries have repeatedly said that nuclear weapons are not the objective of their atomic energy activities. It is important to realize, however, that at their present level of scientific, technical and industrial development, either one could manufacture a plutonium device, similar to the one India exploded in 1974.

For countries such as Argentina and Brazil, becoming a nuclear weapon state is no longer a technical problem but a political one. Consequently, if one decided to "go nuclear," the other could follow at once and a nuclear race would start. The cooperation agreement signed in 1980 could be of great help in preventing such a decision from being taken, because it makes relations between the parties more transparent. (Continued on Page 10S)

Brasilia-Bonn Accord: An Assessment

\$30-Billion Agreement Is One of World's Largest and Most Controversial

By Alan D. Miller

BONN — Seven years into West Germany's transfer of nuclear technology to Brazil, the South American giant is running extremely low on cash while its European partner is banking on patience and the confidence that it made a wise decision in 1975.

That was the year the two countries signed "The Great Cooperation," a joint project to construct eight nuclear power plants and provide Brazil with the technological know-how to construct and maintain an entire nuclear industry — from uranium mining and reactor building to the reprocessing of spent fuel — without foreign assistance.

The estimated \$30-billion project is certainly West Germany's, if not the world's, largest transfer of technology. At the time the deal was made, it was also the most controversial. There were those — prominent among them was former U.S. President Jimmy Carter — who said the Brazilians could use their new-found knowledge to build a nuclear bomb.

The Germans did not deny that possibility, but then, as today, they remain confident that Brazil will not misuse its nuclear know-how, a Bonn government official asserted.

"Why antagonize developing countries by making them fight for nuclear power?" a member of the nuclear industry asked rhetorically. "Any country can obtain the technology if it wants it bad enough. It's just a question of how long it will take them."

This transfer of technology, which is often portrayed by the German government and nuclear industry in an air of good will toward developing countries, is

also undeniably based on a long-term profit motive.

The magnitude of the project — one that will have spanned at least 25 years by the time it is completed — makes it difficult to determine how much they will collect in direct profits, but the Germans are more concerned about the future. The fact that the first two power plants are still at ground level and other phases of the program are years behind schedule at varying stages of design and construction seems to be of little worry to the Germans.

"I think it is justifying the effort," a spokesman at the German Federal Ministry for Research and Technology said. "It establishes links on the industrial, technological and political sides. And it is a starting point for a host of joint projects and trade agreements in the future."

The Bonn government's philosophy is based on ensuring that nuclear power is used for peaceful purposes. "Our policy has been one of controlled cooperation, rather than nonproliferation through the flat denial of nuclear technology," a government official said, adding, however, that not every country would receive that cooperation merely for the asking.

"Each country is studied and assessed on an individual basis. This is not a unilateral policy, so we can not say that the Brazilian policy will be applicable to the entire world. There are some countries we would never supply with nuclear technology."

It is partly due to this line of thinking that West Germany is now second only to the United States as a world exporter of nuclear power plants. Bonn's more liberal view on exporting supportive

BUENOS AIRES CONFERENCE

When the first International Conference on Nuclear Technology Transfer met in Iran five years ago, Shah Mohamed Reza Pahlavi was promoting nuclear power as part of an Iranian industrialization drive. The Shah is gone, but two half-finished 1,300-megawatt nuclear power stations at Bushehr on the Gulf seem still to hold some interest for Iran's revolutionary regime. Representatives of the government have opened negotiations with West Germany's Kraftwerke Union (KWU), which was building the plants until Iran stopped payments in 1979, to discuss completion of at least one reactor plant.

The second International Conference on Nuclear Technology Transfer that opens Nov. 1 for a week in Buenos Aires brings together representatives of government, industry, state enterprises, research centers and international organizations involved in the nuclear technology field. The meeting is co-sponsored by the Argentine Association for Nuclear Technology, with the backing of Argentina's Atomic Energy Commission, and both the American Nuclear Society and the European Nuclear Society. The conference agenda covers general policy matters governing the transfer of nuclear technology and specific technical questions based on experiences in international cooperation.

Among the subjects to be covered are transfer of plant engineering technology, nuclear education and training, nuclear standards and quality assurance, plant safety assessment, fuel cycle and construction technology, waste management, standards and codes and multinational projects.

technology with the power plants has made it attractive on the world market. And German officials are proud of their record. No country with which Germany traded has broken a contract for nuclear power or gone against international nuclear laws.

The German nuclear industry currently has contracts similar to the Brazilian agreement, although not as large, with Spain and Argentina.

One project that could have contaminated the German record was a deal struck with Iran in the mid-1970's for two nuclear power plants and the training to operate them. That contract, as well as construction on the partly completed structures, was suspended in 1979 after the deposed Shah Reza Pahlavi was replaced by Ayatollah Ruhollah Khomeini.

None of these projects, however, approximated the scale of the technological transfer taking place in Brazil. And the Brazilian project will be the only one in which West Germany supplies the know-how for nuclear fuel reprocessing — a process in which a low-quality bomb-grade plutonium is produced. It was this one aspect of the program that caused the greatest amount of alarm among some world leaders, and in 1977 the German government banned the future export of reprocessing technology.

The timetable for completion of the cooperative venture in Brazil has slipped well beyond the original schedule of 1990, and officials in Bonn say even the most recent target of the year 2000 is being optimistic.

There are several reasons the

(Continued on Page 9S)

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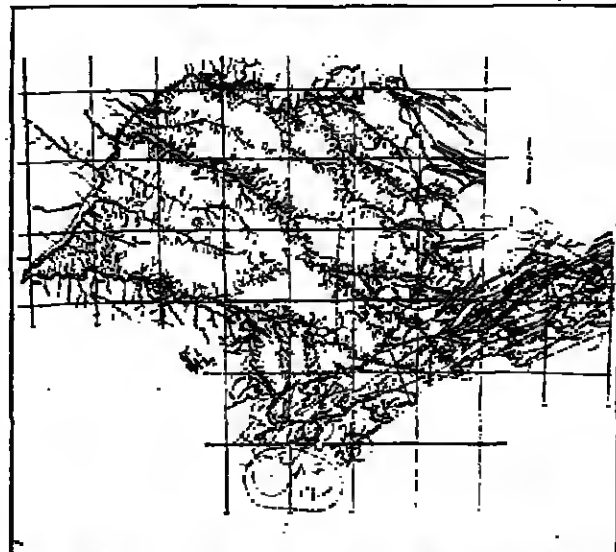
Nuclear power plants

PROMON ENGENHARIA S.A. PROVIDES A COMPLETE RANGE OF SERVICES FOR NUCLEAR POWER PLANTS, INCLUDING STRUCTURAL, ARCHITECTURAL, PIPING, MECHANICAL, ELECTRICAL, INSTRUMENTATION AND CONTROL ENGINEERING; SITE SELECTION; CONSTRUCTION, COMMISSIONING AND OPERATION SUPPORT; QUALITY ASSURANCE; WASTE MANAGEMENT; TRANSPORT AND ACCIDENT ANALYSIS.



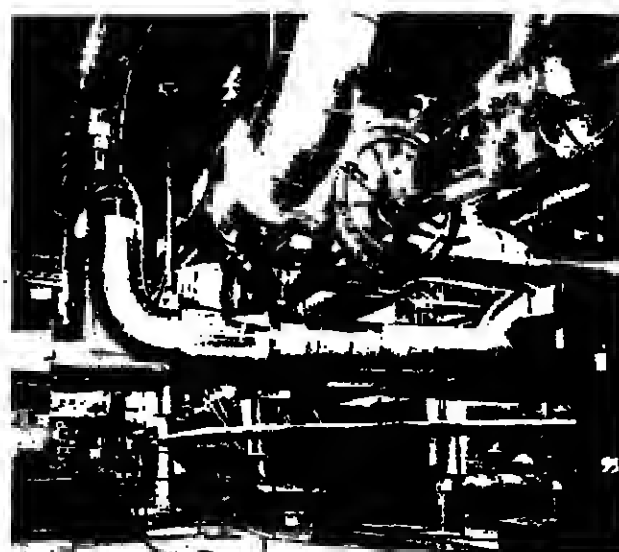
Almirante Álvaro Alberto nuclear power plant — Units I (in the background) and II (under construction) in Angra dos Reis, State of Rio de Janeiro.

Site selection



Site selection study developed for São Paulo Nuclear Power Plants.

Piping design



Piping systems of Angra Nuclear Power Plant Unit I.

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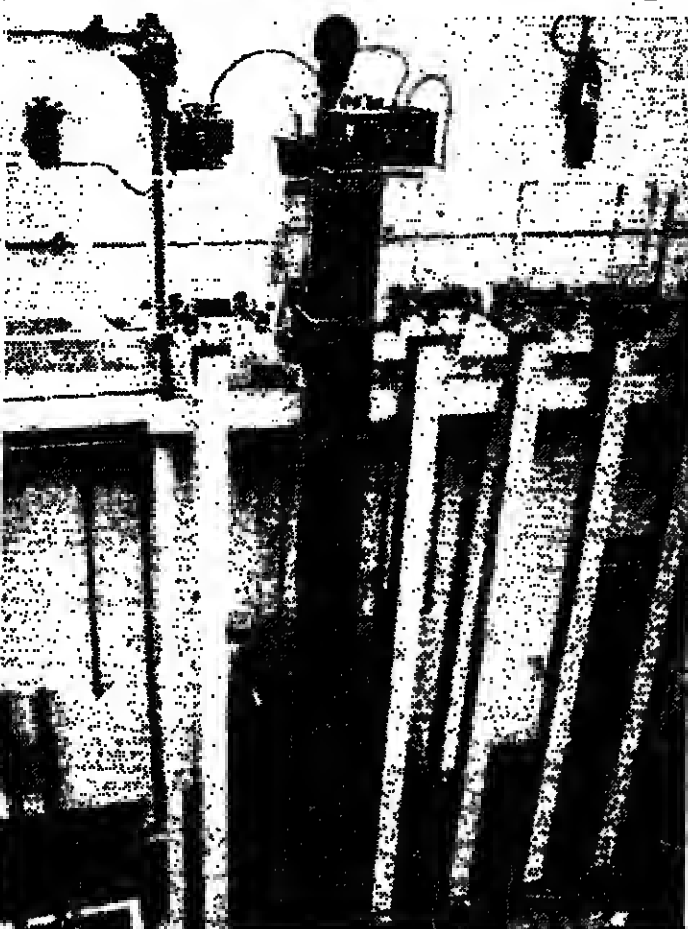
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LATIN AMERICAN NUCLEAR TECHNOLOGY

Brazil's Crash Program for Nuclear Energy Technology Slows to Realistic Pace



A completed fuel element fabricated at the NUCLEBRAS factory inaugurated Oct. 20 at Resende. Here it is given final verification by a technician.

(Continued from Page 55)

reactor pressure vessel at the Argentine nuclear plant Anheia II, which is being built to a design provided by KWU. It has also started work on the pressure vessel for Brazil's third German-designed reactor, and has on order the same for the fourth.

In addition, it has orders for the third plant covering four steam generators, the pressurizer for the second reactor, and the accumulators and condensers for all other reactors. This means that heavy component production will increase from 10 percent of the reactor in the first two to 20 percent in the next two, and after that NUCLEBRAS expects to be in a position to provide a complete primary system for subsequent reactors.

John Forman, a NUCLEBRAS director, said, "The complex technology transfer program foreseen in the German-Brazilian agreement should be completed with the already decided construction of the first four nuclear power stations." This would mean that NUCLEBRAS, the engineering subsidiary of NUCLEBRAS, would by then be in a position to do the full engineering and architecture for a KWU-designed 1,300-megawatt reactor, adapting the components to Brazilian industrial conditions, metal specifications and local conditions of terrain, climate, water and other factors that are not on a blueprint.

This is the manpower side of the technology transfer process that is not so readily visible but that is the heart of the matter. Ronaldo Fabricio, director-superintendent of NUCLEN, said, "The know-how transfer is only possible when there is a long, continuous person-to-person cooperation between the suppliers and the receiver of the technology, so we chose to enter into a number of joint ventures with different German companies."

For instance, NUCLEP, the heavy component company, is owned 68.6 percent by NUCLEBRAS and the remaining equity is shared in equal parts by KWU, Gutzhoffnungsbetriebe, a West German equipment manufacturer, and Voest-Alpine of Austria. NUCLEN is owned 75 percent by NUCLEBRAS and 25 percent by KWU.

NUCLEBRAS manpower training has given special nuclear courses to 2,250 engineers and high-level technicians, including 325 who have studied in West

Germany at production and engineering enterprises since 1974. Of these 118 engineers are at NUCLEN, and the target is 250.

Mr. Fabricio said that engineering training had gone so well that last year, when the Brazilian program slowed down, DKW kept 30 Brazilian engineers working in its own nuclear engineering offices for a year. "This shows that they had demonstrated a reliable capability," Mr. Fabricio said.

On the problem of cultural interaction in a manpower program involving exchanges of personnel between two nations of different languages and industrial experience, Mr. Fabricio said he felt that consensus was not always possible. "But you can harmonize discussion, which is what we do here, and everyone learns and gets on with the job," he said.

Mr. Fabricio, who was also mayor of Niteroi, a large city across the bay from Rio de Janeiro, said, "It is easier to be mayor of a city than to put a nuclear program in place."

Mr. Fabricio has two key jobs, in addition to the engineering work. One, with the help of 38 German engineers at NUCLEN (there are 390 Brazilians), is to act as the technical manager for installation of the nuclear power and steam system as reactors are mounted and put into operation at the construction site.

The other is the complicated job of coordinating procurement of thousands of parts and components of a power station from Brazil's industry. A consortium of three major firms will supply 50 percent of the mechanical, electrical and construction materials. This includes pumps, compressors, heat exchangers, cranes, metallic structures and heavy steel containment vessels.

Mr. Fabricio said: "NUCLEN serves as the intermediary for technology transfer with Brazilian industry. This includes establishing systems of quality control for suppliers that is up to German standards, and this example is spreading to other industrial sectors."

There is a high cost for this, however. Procurement policies by NUCLEBRAS recognize a 60-percent surcharge over the price in Germany for Brazilian suppliers, plus freight and a percentage for technology transfer paid by NUCLEBRAS of as much as 5 per-

cent of the cost of the equipment. "This is the price of nationalizing nuclear technology," Mr. Fabricio said. In addition to all its other activities, NUCLEBRAS has had to take on the job of being prime contractor for building nuclear reactors.

Brazil's first venture into the nuclear field was a turnkey contract with Westinghouse for a 615-megawatt reactor that was originally agreed to in 1968. After many delays, construction was finished and Angra I, as the Westinghouse reactor is called, went critical early this year. It was then discovered that a preheated water system produced turbulence in the pressure vessel, so the plant can run at only 30 percent of capacity until the fault is corrected. Industry sources said 14 other Westinghouse reactors have the same problem around the world and all have to be changed.

But the delays in building Angra I were also more than duplicated in the foundations for Angra II, which is the first of the DKW reactors under the West German agreement. The construction contract had been delegated to Furnas-Centrals Electricas, which is the utility that operates Angra I and will also receive Angra II and III.

With Angra II more than two years behind schedule, NUCLEBRAS set up a construction subsidiary, NUCON, and took over finishing Angra II. All future plants will be built with NUCON as prime contractor and general superintendent. The completed and commissioned reactor will then be turned over to the utility, which will have 10 years to pay NUCLEBRAS.

Beside the horseshoe bay at Angra dos Reis, an old fishing village that was chosen as the site of the first reactor, work goes forward briskly on the foundation and containment walls for the reactor vessel and primary steam system. The civil contractor, Norberto Odebrecht, is a large Brazilian firm that has 3,900 workmen in yellow safety helmets crawling over the huge site like an ant. Large cranes lift steel containment plates into the cup being formed for the reactor. Cement is poured at a rate of 25 cubic meters an hour.

Isaac Levy Berman, a construction supervising engineer, said, "This one is going to be done on time." He worked on the São Paulo and Rio de Janeiro subway and a railroad for private contractors before

joining NUCON, which has 250 engineers on the Angra II job. Under the extended schedule, Angra II is scheduled to be finished in 1987. Angra III, on which foundation work is just beginning, is to be commissioned in 1989.

The site chosen for the next two reactors is on the coast of São Paulo, south of Santos, at Itaipu. Work is under way preparing construction sites, and the third and fourth reactors are to be in operation in 1991 and 1992 respectively.

It is reasonably certain that Brazil will make every effort to carry out the present reactor construction plan, despite the serious financial difficulties that face every state investment now because of the economic recession. The timing of new nuclear power starts will be influenced, however, by the overall demand for electric power. This has slowed sharply from the average annual increase of 11 percent between 1970 and 1980. Because of the recession it rose only 3.2 percent last year, and is about the same now.

There is no question that Brazil will continue to make massive investments in electric power, particularly as a substitute for imported petroleum, which is costing more than \$10 billion a year. With a large domestic uranium supply, nuclear power is a natural substitute for oil-fueled thermal power stations. The main question is how much of the future supply will be hydroelectric, which accounts for 91 percent of Brazil's generating capacity, and how much nuclear.

Mr. Forman said, "The nuclear program is part of a much larger strategy that aims by means of a radical change in the energy base of the Brazilian economy to reduce imported energy." He argues that nuclear power should provide 10 percent of generating capacity by 1995. This position has been accepted by the present government and ELECTROBRAS, the holding company for Brazil's nationalized electric generating sector.

But working out conflicting claims between companies based on large hydro projects, proponents of coal-fired thermal plants in southern Brazil, where coal abounds, and NUCLEBRAS is a continuing struggle. The future of the nuclear power industry here depends heavily on whether NUCLEBRAS achieves its dream of enriching uranium at a competitive cost.

Brazilian Nonrenewable Energy Reserves

| Sources | Value | Energy amount in 1000 tons of crude oil Equivalent |
|--------------|-----------------------------|--|
| Crude oil | 213 million cubic meters | 179,000 |
| Natural gas | 52,500 million cubic meters | 48,000 |
| Shale oil | 672 million cubic meters | 565,000 |
| Mineral coal | 22,600 million metric tons | 4,270,000 (1) |
| Uranium | 301,490 metric tons (U3O8) | 4,126,000 (2) |
| | | 296,349,000 (3) |

(1) Recovery of 50% of deposits.
(2) Without reprocessing (PURE) and accounting for losses in mining.
(3) Considering fast breeder reactors.

Source: Ministry of Mines and Energy, 1982, NUCLEBRAS.

Uranium Exports Could Offset Brazilian Oil Import Bill

POCOS DE CALDAS, Brazil—

Less than 10 years of systematic prospecting for uranium have put Brazil in the front rank of world producers with reserves calculated conservatively at more than 300,000 metric tons (330,000 short tons) of yellowcake uranium oxide.

The next step in Brazil's ambitious uranium development program may lead to an export capability after 1990 with enriched uranium fuel elements for power reactors made in Brazil. This would provide an energy trade-off, with uranium exports offsetting Brazil's

balance of payments problems arising from heavy oil imports.

Brazil now stands fifth in non-Communist world uranium reserves, behind the United States, Canada, Australia and South Africa. There are strong probabilities of major new uranium finds in Brazil as exploration programs are extended, particularly into the as yet almost unexplored Amazon region.

The \$230-million Osamu Usumi open-pit mine, mill and concentrator complex at Pocos de Caldas, 250 miles (400 kilometers) northwest of Rio de Janeiro in a highland mining region, began

production this year of yellowcake.

The uranium concentrates that is the first step in Brazil's nuclear fuel cycle. The plant can produce 500 metric tons a year of yellowcake, which only nine other countries are making on an industrial scale. The basic project was designed by Uranium Pechiney Uguine Kuhlmann of France, but the concentration process was developed by Brazilian engineers. The plant and mine employ 1,700 workers.

It takes about 600 metric tons of yellowcake to produce the 100 metric tons of enriched uranium that goes into the initial load of reactor fuel elements for a 1,300-megawatt nuclear power station. Brazil is now building two of these in cooperation with West Germany's Kraftwerk Union (KWU) and plans to finish six more by the end of the century.

The initial load costs at least \$100 million, at present enriched uranium prices, and this is replaced seven times over the 30-year life span usually assigned to a nuclear power reactor. Therefore, supplying enriched uranium can quickly become a multibillion-dollar business.

John Forman, a director of Brazil's state nuclear power company, NUCLEBRAS, said that the present reserve level of 301,490 metric tons was enough to supply 46 nuclear power stations of the size now being built. This is at least double the number of stations that Brazil expects to build over the next 30 years. By that time, Brazil expects to be generating power from fast neutron breeder reactors using reprocessed fuel from the initial primary reactors.

Mr. Forman said, "Brazil has the potential to become an energy exporter in the not too distant future, and such exports will take the most elaborate form possible, that is to say, enriched uranium." Mr. Forman, a chemical engineer with responsibility for Brazil's uranium enrichment program, refused to make guesses about the country's reserve potential, which some geologists think could reach 1 million tons.

"These are dreams that have not yet become a reality," he said. But it is already clear that NUCLEBRAS is planning to turn its biggest find, the Itaipu field in Ceará state, with a rated reserve now of 142,500 tons, into an export operation.

The yellowcake plant built in Pocos de Caldas is beside a surface mine with rated reserves of 26,800 tons.

Mr. Forman said the cost of yellowcake production is less than \$30 a pound through a sulphuric acid leaching process that also produces molybdenum and zirconium, two useful metals, as by-products. This operation, and future yellowcake facilities at Lagoa Real, a 93,190-ton site in Bahia, will be reserved for domestic requirements.

The big Itaipu field is a uranium-phosphate ore body that is up to 400 meters (132 feet) deep, with yellowcake concentration of up to 0.9 percent.

NUCLEBRAS is working on a special extraction system that will be tested in a pilot plant with a nominal capacity of 50 tons of uranium oxide and 6,300 tons of phosphoric acid a year. This plant should become operational in 1985.

The major development of Itaipu depends, however, on research now taking place on the aerodynamic enrichment process, known as jet nozzle, that is being developed jointly by NUCLEBRAS and a group of West German companies, led by Steag, and the Karlsruhe research institute. This is a key part of the West German-Brazilian nuclear cooperation agreement signed in 1975.

This system will receive its first large-scale operational test at a demonstration plant that is being installed at Resende, Rio de Janeiro state, where NUCLEBRAS inaugurated on Oct. 20 its first fuel element fabrication plant.

The first 24 modules designed to capture the fissionable U235 isotope from yellowcake, converted into gaseous uranium hexafluoride and circulated under pressure through a precise system of deflectors, will be in operation next year. This first cascade will be followed by an extension containing 196 modules, and eventually an industrial plant.

This is Brazil's alternative to the gaseous diffusion method employed in the United States, France and the Soviet Union, or the ultra centrifuge system of the URENCO trioka of West Germany, the Netherlands and Britain.

These are not available to developing countries because of security restrictions, as well as huge cost for the gaseous diffusion system.

If the Resende plant lives up to NUCLEBRAS expectations, the enrichment state of the nuclear fuel cycle will become part of uranium export strategy.

In addition to relatively abundant uranium ore, Brazil has cheap electric energy from hydroelectric sources, such as Itaipu and Amazon river sites. The major operating cost in the aerodynamic enrichment system is electricity.

Paulo Nogueira Batista, president of NUCLEBRAS, said in an interview that one possibility for developing Itaipu would be to install one of the eight 1,300-megawatt nuclear power stations that are to be built under the West German-Brazilian accord at the site of the Ceará State mine.

This would generate the power necessary for a large enrichment plant.

With the start-up of the fuel element fabrication plant at Resende, Brazil is developing the technological capability to make a complete reactor fuel core.

This goes along with the capability of manufacturing the heavy components of a nuclear power station at the NUCLEBRAS plant at Itaipu.

Technology transfers have not played a major part in Brazil's uranium prospecting, but one aspect of the search for uranium here is a key element in the West German-Brazilian nuclear technology agreement.

Under the pact, a joint company was created called NUCLAM, with 49-percent ownership by Urangelschaft, a West German mineral trading company, to conduct exploration in Brazil and extract and process uranium ore. West Germany is entitled to 20 percent of NUCLAM's uranium at international prices, which makes this a relatively reliable source for West Germany's future nuclear fuel requirements.

A West German diplomat in Brazil said, "There was a lot of resentment in West Germany when Canada put restrictions on uranium exports for our breeder reactor program, and there is a strong desire to diversify our sources. Brazil

is an important alternative source."

So far, NUCLAM has made only one significant find, the Espirito Santo deposit in Brazil's northeast state of Paraíba. This has a reserve rated at 10,000 metric tons, in a mineral body going 250 meters deep composed of pitchblende, uranite, and beta-uranophane. It is considered of similar geologic origin to Itaipu but much less important as a mining prospect.

The success of the Brazilian exploration effort can be measured by the growth of proven reserves. When NUCLEBRAS was created, the Brazilian reserves were rated at 11,040 tons of yellowcake. The present level of 301,490 tons represents a 13.2-percent increase over last year's rated reserve.

The uranium search began with surface and airborne gamma-ray surveys that covered about 75 percent of Brazil's Precambrian rock units. This turned up the first evidence of Itaipu and Lagoa Real. More detailed studies followed, and reserves are now defined as those that are economically viable on the basis of \$33 a pound of yellowcake. That is internationally competitive.

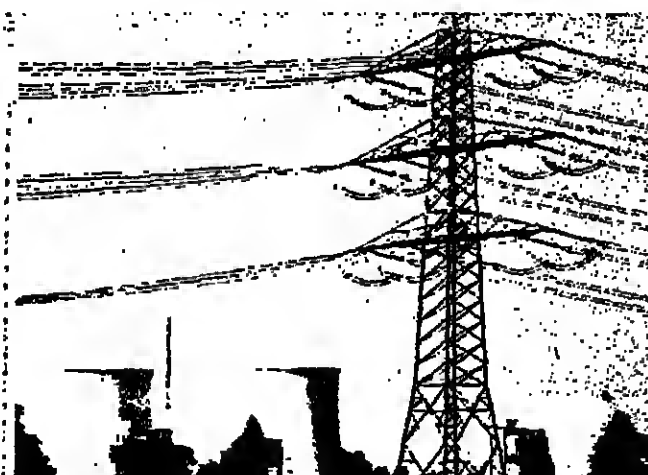
One major deposit, Figueras, was discovered in Paraíba state, after a survey of coal basins in southern Brazil. The reserve rating is 8,000 tons, but this body involves expensive shaft mining.

The ore body in Pocos de Caldas is easier to work, with 35-ton trucks and heavy earth-moving equipment pulling ore off the terraces chiseled into the low, rolling hillsides. The average grade of the minerals is 0.08 yellowcake, which is low, but the extraction process is efficient and produces valuable by-products.

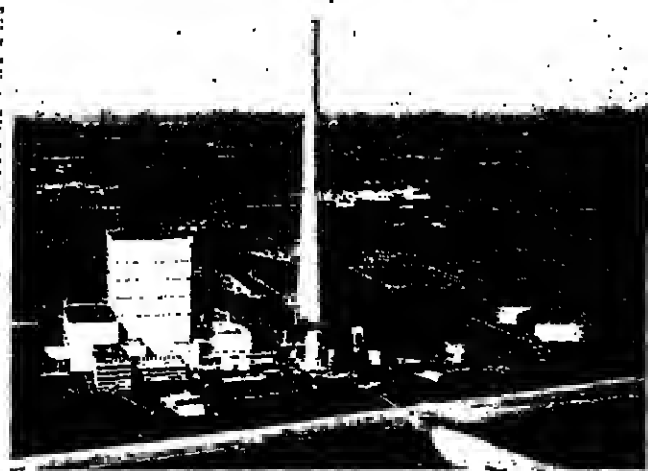
The Lagoa Real site has an average grade of between 0.2 and 0.3 percent yellowcake in ore bodies that go 600 meters deep. Exploration galleries are being opened in two of the 18 ore bodies, and operations will begin in 1988 to produce 1,000 tons a year, or double the production level in Pocos de Caldas.

With this experience, and the progress of the enrichment process, Brazil will then be in a position to tackle the Itaipu field with prospects of becoming an enriched uranium exporter.

—JUAN DE OUS



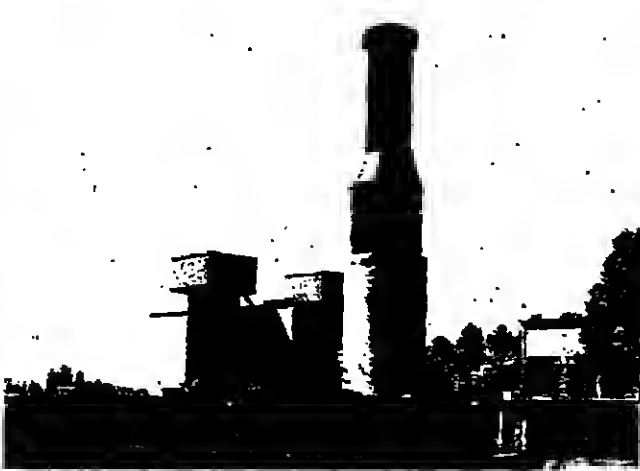
Bilibie, one of the largest nuclear power stations in the world. The two PWR units went into operation in 1974 (1200 MW Unit A, right) and 1976 (1300 MW Unit B, left).



The 720 MW Wilhelmshaven Power Station (commissioned in 1976) is not only one of the largest but also one of the most environmentally compatible conventional power plants in Europe.



The Brunswick BWR Nuclear Power Station (1976) has a capacity of 805 MW.



The largest gas turbine in the world (120 MW) has been in operation at Walhalla Power Station since 1981.

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tor sets. Kraftwerk Union furthermore plans and supplies all the electrical and mechanical equipment for thermal power plants, including equipment for plant automation, and offers a complete nuclear fuel management package and a wide range of service and advice in all questions of power application.

Kraftwerk Union's Berlin works produce gas turbines, single casing condensing turbines and ship propulsion turbines. At the three Mülheim works multi-casing steam turbines and turbine generators are manufactured. Reactor research and development are done at the Erlangen and Karlsruhe a. Main research centers.

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LATIN AMERICAN NUCLEAR TECHNOLOGY

Brazil-West German Nuclear Technology Training Program

| TYPE OF COURSES | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | TOTAL |
|---|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| Brazil | | | | | | | | | |
| Specialization Course on Nuclear Technology | — | 71 | 76 | 73 | 107 | 71 | 66 | 49 | 513 |
| Quality Assurance | 135 | 57 | — | 95 | — | — | 19 | 64 | 370 |
| Training in Industry | 14 | 8 | 54 | 33 | 14 | 128 | 341 | 269 | 861 |
| Prospection and Mineral Research | — | — | 28 | 33 | 42 | 51 | 28 | 3 | 185 |
| Total | 149 | 136 | 158 | 234 | 163 | 250 | 454 | 385 | 1,929 |
| Abroad (Missions) | | | | | | | | | |
| Reactor Engineering | 3 | 10 | 17 | 26 | 51 | 23 | 26 | 15 | 171 |
| Heavy Components | — | — | — | — | 41 | 5 | 4 | 1 | 51 |
| Fuel Element Fabrication | 4 | 10 | 3 | 3 | 10 | 28 | 21 | 1 | 80 |
| Enrichment | — | 4 | — | 3 | 11 | 9 | 7 | 8 | 42 |
| Reprocessing | 3 | 2 | 2 | 2 | 9 | — | 1 | 1 | 20 |
| Radiological Protection and Safety | 1 | 1 | 4 | 3 | 3 | 1 | — | 3 | 16 |
| Research and Development | 15 | 9 | 4 | 3 | 9 | 9 | 4 | 3 | 56 |
| Prospection and Mineral Research | — | 1 | 7 | 18 | 49 | 15 | 2 | 2 | 94 |
| Total | 26 | 37 | 37 | 58 | 183 | 90 | 65 | 34 | 530 |

RESENDE: General view of the NUCLEBRAS fuel element plant at Resende, Brazil. It was inaugurated on Oct. 20.

'Jet Nozzle' Fuel Enrichment System Could Bring Brazil Into an Elite Club

RESENDE, Brazil — The great challenge in the West German-Brazilian nuclear technology agreement is the joint development of a uranium enrichment process that has never been tested on an industrial scale.

All other aspects of the accord, which provides the technical underpinning for a \$25-billion nuclear energy plan, involve the transfer of proven technology for the construction of eight power plants and most of the steps for a complete fuel cycle. The enrichment process, however, is still experimental. It was designed and engineered initially at the Karlsruhe Nuclear Institute, a West German research center. The patents are now owned jointly by NUCLEBRAS, the Brazilian state company, and Steag, a major West German power company.

The first demonstration plant is being assembled here in the Paraíba River valley west of Rio de Janeiro. If the industrial application of what is known as the "jet nozzle" enrichment system can be made to work efficiently, Brazil will join a very select club of countries that can produce and supply the fuel elements used in light water reactors.

The enrichment facility is housed in an aseptically clean industrial building that can only be entered wearing special slippers to eliminate dirt on shoes. There are 30 technicians from Interatom, a subsidiary of West Germany's Kraftwerke-Union (KWU), working on the assembly of the first 24

modules of the gas-separation process that increases the proportion of fissionable U235 in reactor fuel.

Nearby, in another new building, is a fuel element plant that was inaugurated Oct. 20. It is already producing shiny racks of zirconium rods filled with pellets of enriched uranium oxide. These will be used to reload the 628-megawatt Angra I reactor that began operating this year with fuel elements imported from the United States.

Initially, the plant will produce 140 fuel elements, each carrying 300 kilos (1,100 pounds of uranium) a year using pellets of uranium oxide enriched by URENCO from Brazilian yellowcake. By 1986, when a unit is added that can convert enriched uranium hexafluoride gas into crystallized uranium oxide and sinterize this powder into pellets, the \$50-million plant will be operating with 600 workers making up to three elements a day. Each element costs \$750,000.

Roberto Esteves, a nuclear engineer with a doctorate from the University of California at Los Angeles, is the superintendent of the fuel element plant. Fifty-two of the Brazilian engineers and technicians at the plant have spent up to a year training at a similar plant in West Germany. Five KWU production supervisors control quality and work with Brazilian management. If KWU standards are not maintained, the element is rejected.

Clovis Travassos, an industrial engineer who spent most of 1979 in West Germany supervising the Brazilian training, said: "We are very careful about quality. We learned in Germany that the guarantee of quality is essential in the nuclear industry."

A conversion plant to produce uranium hexafluoride from yellowcake is to be built at Resende by 1984, with Pechiney Ugine Kuhlmann technology. The first stage cost will be \$68 million.

The link between the fuel element plant and the enrichment facility will be completed when the jet nozzle modules have been assembled in an industrial system that effectively produces enough enriched uranium hexafluoride from Brazilian yellowcake to feed the pelletizing unit.

Roberto Vidal, a chemical engineer who is the overall superintendent of Resende activities, said: "This is not really a problem of technology, since we know the jet nozzle process enriches. What we have to do is make this work on an industrial scale as a system." Mr. Vidal is also a director of NUCLEBRAS, a NUCLEBRAS subsidiary in charge of constructing and operating the enrichment plant. Two West German partners, Interatom and Steag, own 25 percent of NUCLEBRAS.

The enrichment facility is going to be the biggest single investment of the \$3.5 billion that NUCLEBRAS has budgeted for development of the fuel cycle by 1993. The

first stage, now being installed with 24 modules, is supposed to be operating by the end of next year. A 288-module cascade will be added in 1986, and a full system is scheduled for 1988 with a capacity that would produce enough fuel to load a 1,300-megawatt reactor every 18 months thereafter.

A great deal of work on applied technology of the enrichment system is taking place both at the NUCLEBRAS Center for Nuclear Technology Development in Belo Horizonte and in West Germany through NUSTEP, a joint Brazilian-West German company that holds the patents and is responsible for research and development. The inventor, Erwin Becker, chief of the Karlsruhe Nuclear Research Institute, has made several visits here.

The aerodynamic principle of the "jet nozzle" system is similar to the centrifuge process, but it is much simpler mechanically, since it does not require the very high speed centrifuges. However, it consumes more electricity to produce an equivalent separation of heavier and lighter uranium isotopes, which is necessary for enrichment. Therefore, reduction of cost depends greatly on efficiency of power utilization in the system and improvements in the pressurized deflection of isotopes into two streams as the gas passes through metallic nozzles.

John Forman, the NUCLEBRAS director who oversees the enrichment program, said that im-

provements already introduced had produced a 10-percent reduction in estimated cost. He said exact figures were an industrial secret. Mr. Forman showed a new model of the nozzle, an aluminum-magnesium alloy ring, in which the opening through which the gas undergoes deflection had been reduced from 100 microns to 50 microns. This increases effective pressure, which increases yields and reduces the amount of alloy tubing for each module, a major saving. A new double deflection technique is also under study.

Mr. Forman said, "We believe that we will have a commercial plant operating by 1993, and we believe that it will be commercially competitive with other processes." He said that the long lead time in reaching commercial production was normal in the nuclear energy industry. "URENCO is into the 14th modification of its centrifuge system after 20 years of development, so one should be surprised if it takes us 10 years to get our enrichment process perfected," he asserted.

NUCLEBRAS officials argue that autonomy of supply of nuclear fuel is the overriding consideration in the enrichment field in view of international restrictions on access to this sensitive technology. Cost comes second.

Paulo Nogueira Batista, NUCLEBRAS president, said, "It is all right to pay a little more to have an assured source of fuel, rather than run the risk of having the supply suspended, as happened to Brazil under the [President Jimmy] Carter administration." That cutoff of enriched fuel came after the U.S. Congress passed a law saying that U.S. nuclear supplies should be withheld from countries where any nuclear facility is not under adequate international safeguards, regardless of whether the facility is receiving a U.S. contribution or not. All activities involving West German technical transfers are covered by inspection agreements with the International Atomic Energy Agency, but Brazil has some small research centers that could theoretically undertake unsafeguarded work.

The deadlock with the United States was relieved by an agreement that waived a penalty clause under the enriched fuel supply contract if Brazil bought elsewhere. This cleared the way for acquiring enriched fuel from URENCO. But Brazil still considers the U.S. suspension a contract violation and an affront.

The uncertainties that exist over the cost and eventual financing of a future enrichment plant took up much of the time this year of a congressional investigation on the West German-Brazilian technology transfer agreement and overall nuclear policy. A report on the investigation issued in August estimated that the first extension of the cascade, requiring 288 additional modules, would cost \$404 million and a full industrial line would require an investment of \$800 million more.

The U.S. Senate called on NUCLEBRAS to review existing contractual obligations in joint companies, such as NUCLEL, to commit the West German partners to providing risk capital on the ba-

sis of existing equity (NUCLEBRAS 75 percent). West German partners 25 percent) for the industrial enrichment facility and a future reprocessing plant for spent fuel.

The location of the reprocessing plant has not been decided yet by the licensing Brazilian Atomic Energy Commission, but it forms part of the NUCLEBRAS complete fuel cycle plan. A pilot plant is scheduled to be constructed in 1986. The reprocessing plant would, among other things, provide plutonium for the day when Brazil moves into the new technology of fast neutron breeder reactors.

Under a general technology transfer agreement reached last year with the Italian Comitato Nazionale de Energia Nucleare, the Brazilian Atomic Energy Commission's Institute of Nuclear Engineering has signed an \$11-million contract to obtain assistance from the Italian company NIRA on liquid sodium research. Liquid sodium is used in breeder reactors.

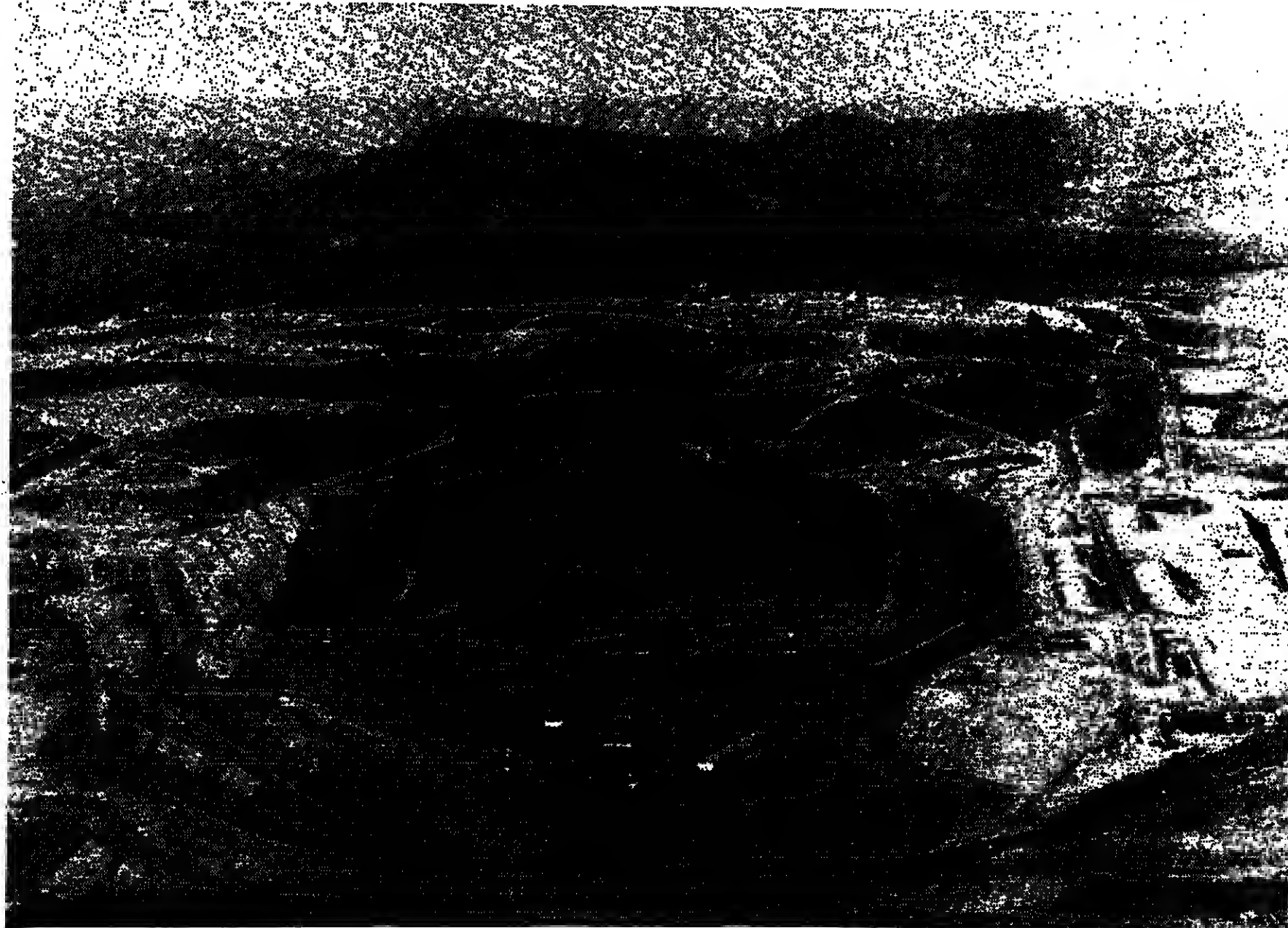
—JUAN DE ONIS

The presence of Construtora Andrade Gutierrez S/A in the production of uranium concentrate in Brazil

Since the first activities of prospecting and research of the uranium mineral ore, performed in 1952 by the National Research Council, to the beginning of the operations of the Nucleo-eletric Plant of Angra dos Reis, many efforts have been attempted in a way to give the country the autonomy in the field of nuclear energy. Important steps of this process have been developed by Nuclebrás at the Industrial Complex of Poços de Caldas, in the state of Minas Gerais, including the mine of Caldas, the plant of uranium concentrate and the auxiliary installation. This complex is producing, for the first time in Brazil, yellow cake (U₃O₈), raw material for the production of combustible element.

By the time the plant is operating at its full capacity, it will be able to produce 550 annual tons of yellow cake, enough for the recharging of the Angra I Nuclear Plant and for the initial charging of Angra II and Angra III.

Construtora Andrade Gutierrez participates in the works of the mine, with services such as stripping, mining and all the civil works of the industrial complex. Since Andrade Gutierrez began its activities in the complex, it has shown its capacity for presenting solutions to the challenges that have come up in the nuclear program related to this combustible element. This capacity was proven, mostly, during the time that the company started the civil works of the complex. In a few days, the company increased its number of employees, providing jobs for 2,500 persons, augmenting its equipment and assembling an adequate infra-structure of base capable of assisting the increase in the number of employees. The works were accomplished before the



scheduled dates by Nuclebrás, despite the strict limitations on the time of execution and under constant rains. Complex works, such as the water treatment station, the cooling tower and three vertical silos (built by the sliding frames process) were constructed.

It was also during this period of time that the high level of productivity of the excavation crew was proven, responsible for the record of 2,327,000 m³ in one month, with a daily amount of 110,000 m³. This fact becomes more relevant if we visualize the distance of 1,5 km between the excavation area and the discharge area. Another distinguishing factor has been the rock excavation with a monthly production of 740,000 m³. Since 1977, approximately 27 million m³ of soil and 9 million m³ of rock have been excavated.

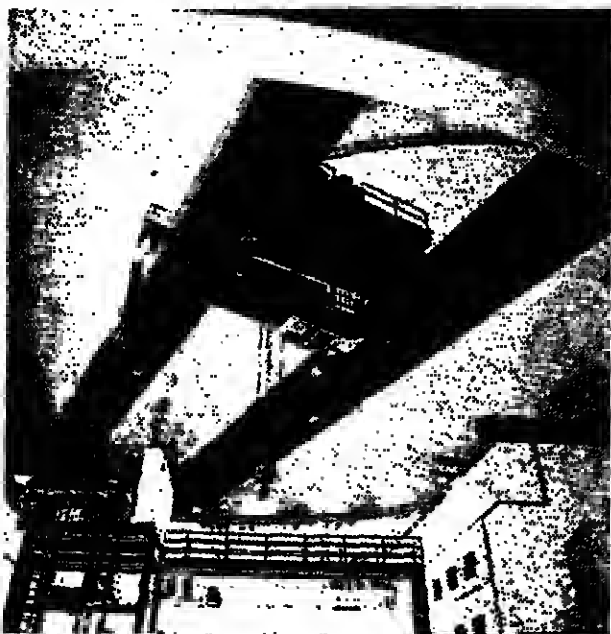
Construtora Andrade Gutierrez S.A. built a dam for storage of liquid and solid waste (slurry), the first in Brazil for this purpose. With a height of 40 m., this dam has in its design, strict structural specifications of permeability in the material used, being the downstream station for the treatment of the effluent water, to preserve the ecology of the region.

The company also built a dam for the sprage of industrial water, with a capacity of 4,000,000 m³ of water, essential for the supply of the industrial complex.

Construtora Andrade Gutierrez S.A., through the engineering services that accomplished in the mine, on the yellow cake plant and auxiliary installations, is proud of being able to participate in the effort of Nuclebrás to include Brazil among the ten countries that produce uranium in the world.

LATIN AMERICAN NUCLEAR TECHNOLOGY

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An Early Advocate of Nuclear Energy

Batista, NUCLEBRAS President, Worked for Technology Pact

RIO DE JANEIRO — Paulo Nogueira Batista, president of NUCLEBRAS, the state nuclear power monopoly, was a career diplomat when he was first introduced to international nuclear politics by the United Nations debate in 1968 on the Nuclear Nonproliferation Treaty.

He belonged to the nationalist sector of the Brazilian foreign office that opposed Brazil signing the treaty, and the military commanders who then and now have the last word agreed.

Mr. Nogueira, 52, is an economist as well as a career diplomat. Assigned to the Brazilian Embassy in Bonn, in 1969 he established close ties with RLF Hauschild of the Ministry of Research and Technology, who became a strong advocate of a West German-Brazilian nuclear technology agreement.

By 1973, Mr. Nogueira was back at the Foreign Office as deputy minister for economic affairs, and when oil prices began to soar late that year, Brazil was one of the major victims, since it was importing 40 percent of its primary energy needs in the form of oil and products.

Mr. Nogueira said in an interview, "It was apparent that we had to make a drastic change

in our energy supply situation or Brazil's development as a nation would be endangered."

ELECTROBRAS, the state electric power holding company, proposed then that nuclear power be added to Brazil's already well-established hydroelectric potential. NUCLEBRAS was created to obtain and implement the special technology and it was then that Brazil found how hard this was to get.

Electrobras had proposed then that eight large nuclear reactors be built, but it was not clear whether these would be acquired in the United States or elsewhere. A contract had already been signed in 1970 with Westinghouse for a 600-megawatt reactor.

General Ernesto Geisel, who became president of Brazil in 1974, had been president of PETROBRAS, the state oil company. He knew the limited possibilities Brazil had of finding abundant oil within its territory. On the other hand, there were strong indications of large uranium deposits.

Mr. Nogueira said, "It was President Geisel who decided that if Brazil was to build eight reactors, this justified a Brazilian nuclear industry and development of an independent fuel cycle with our own uranium enrichment."

Mr. Nogueira played a major part in negoti-

ations with West Germany that culminated in the Treaty for Cooperation in the Field of Peaceful Uses of Nuclear Energy, signed Oct. 3, 1974, by Foreign Minister Antonio Azeredo da Silveira of Brazil and Hans-Dietrich Genscher of West Germany.

Mr. Nogueira, who was named president of the newly founded NUCLEBRAS in 1975, said, "The decision by the Germans to cooperate in developing an independent enrichment program was decisive. We looked around for help from other countries, including the United States, and got no assurances." During the administration of President Jimmy Carter, "the door was slammed shut, as we had suspected," he added.

U.S.-Brazilian relations are still strained by the refusal by the Carter administration and the current administration of President Ronald Reagan to supply additional amounts of mildly enriched uranium, beyond the first load, for the Westinghouse-designed Angra I power reactor.

Brazil had to get the enriched fuel it still needs from URENCO, the West German-Dutch-British consortium.

—JUAN DE ONIS



MOVER: Paulo Nogueira Batista, 52, an economist and former diplomat, is president of NUCLEBRAS. He negotiated the technological cooperation agreement with West Germany and has been head of NUCLEBRAS since the Brazilian state company was formed in 1974.

Rising Costs Threatening Mexico's Nuclear Power Project

By William A. Orme Jr.

MEXICO CITY — At an isolated backwater on the coast of the Gulf of Mexico known as the Laguna Verde, thousands of construction workers have been laboring for nearly a decade on a project that when completed will represent Mexico's first modest venture into the nuclear age — and quite possibly its last.

A twin-reactor facility designed to boost an eventual installed capacity of 1,300 megawatts, the Laguna Verde nuclear power plant has been plagued since the start by cost overruns, technical delays and controversies over safety standards and bookkeeping practices. When construction began in 1973, Laguna Verde was conceived as a three-year project that would cost Mexico's Federal Power Commission no more than \$265 million. Today, with more than \$1.2 billion already spent and another \$520 million allocated, the government does not expect the first 650-megawatt reactor to be ready for fuel loading before early 1985, and industry sources say work on the second reactor has been suspended entirely.

Most industry analysts here, however, expect the full 1,300-megawatt plant to come on stream eventually, probably in 1987. EBASCO, the General Electric subsidiary that is supplying the Federal Power Commission with fuel and reactor hardware, "has al-

ready delivered 98 percent to 99 percent of the equipment contained in its substantial uranium reserves."

Bids for the first 2,300 megawatt plant in the new nuclear network were to be submitted in February 1982, and nuclear salesmen from around the world opened plenary promotion offices in Mexico City and organized scientific conferences extolling the respective merits of their various national technologies.

Distinguished diplomatic visitors also joined in the nuclear sales effort. Pierre Elliott Trudeau asserted that Canada's non-enriched uranium technology would make Mexico less dependent on foreign fuel suppliers, while King, Carl XVI Gustaf used a state visit to put in a good word for the Swedish nuclear industry's emphasis on environmental safeguards.

Pierre Dreyfus, France's minister of commerce, reportedly promised an attractive soft-loan package if Mexico were to award the contract to Framatome. And the United States, with three companies vying for the contract, offered embassy-sponsored symposiums on nuclear power and active diplomatic support for Westinghouse, Combustion Engineering and General Electric.

In the words of a representative of the Swedish nuclear industry, the Mexican nuclear program looked like "the last best hope for the nuclear power industry worldwide." But this hope was abruptly dashed when Mexico announced in February that the scheduled contract litigation had been cancelled and the entire nuclear project was being "revised."

By convincing local fishermen that the plant might raise water temperatures and endanger their fishery, the anti-nuclear movement forced the government to drop its plans for the experimental plant.

But most local opposition to the government's nuclear development plans were based on economic rather than environmental grounds. Critics cited government studies from the United States and India, indicating that the combined construction and operating costs of oil-fired and nuclear power plants had become roughly equivalent in recent years. Yet while nuclear equipment had to be imported, Mexico was self-sufficient in both petroleum and petroleum technology.

Some Mexican economists also

contended that the government's projections of future energy needs were grounded on arguable assumptions, including a sustained economic growth rate of 6 to 8 percent annually and the continuation of the present wasteful energy consumption patterns that have made Mexico one of the most energy-intensive economies in the world.

Mexico uses twice as much energy as France on Japan per dollar of gross national product, a circumstance most analysts attribute to the government's cut-rate prices for electricity and fuels.

"Nuclear power is not only unsafe," asserted José Arias, an anti-nuclear activist working with the Mexican Appropriate Technology Association, "it is economically unjustifiable in a country like Mexico where we already waste more natural gas than we use."

Ultimately, though, the government's decision to cancel its nuclear development plans had less to do with the anti-nuclear movement than with uncomfortable fiscal realities. Critically short of foreign exchange reserves and unable to make payments on its \$31-billion foreign debt, Mexico could no longer consider massive purchases of costly nuclear reactor equipment.

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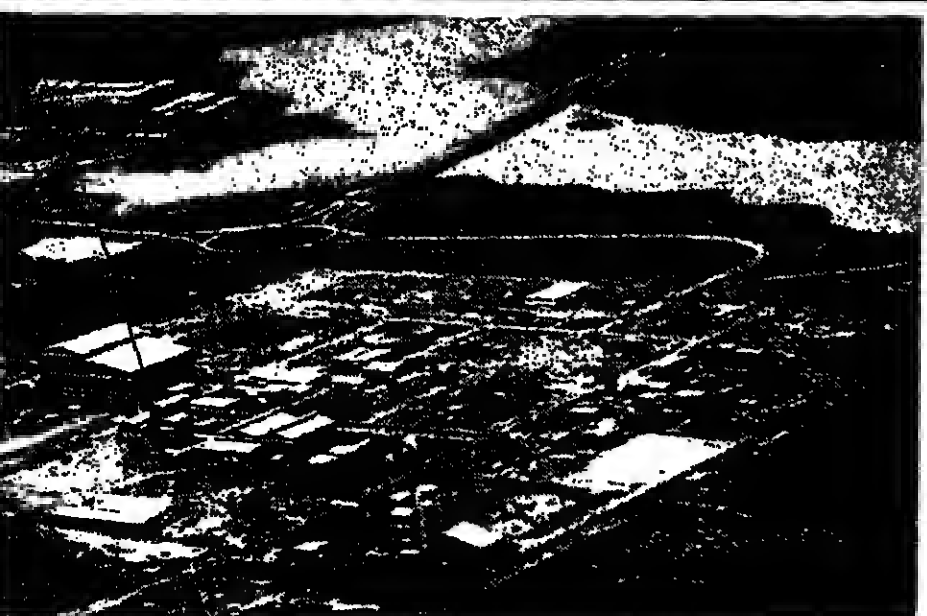
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In addition, Uranium Puk offers a

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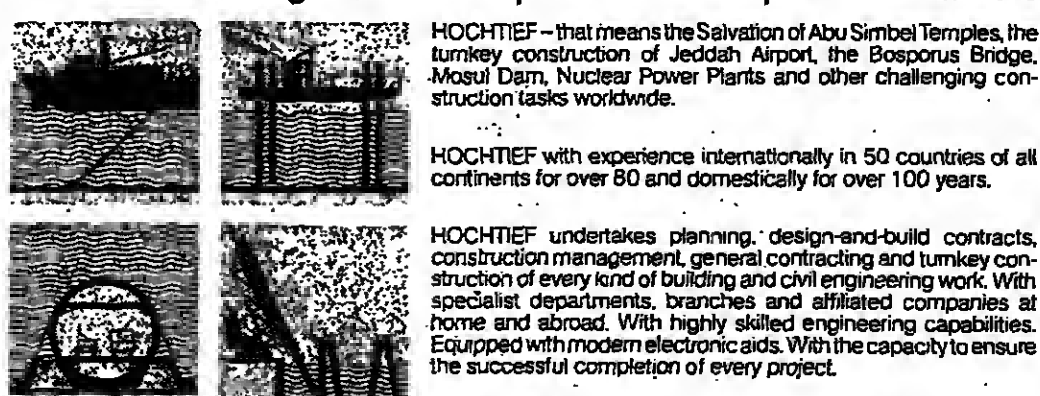
In Brazil Uranium Puk's cooperation built up progressively over the years, beginning, in 1976, with the development of the Poços de Caldas project in the field of ore mining and milling and, more recently, with the conversion facility at Resende.

As the first major uranium concentrate production facility in South America, the start-up of the Poços de Caldas plant (photo) at the end of 1981 marks the success of the technical cooperation between Nuclebrás and Uranium Puk in the field of basic engineering and transfer of technology.

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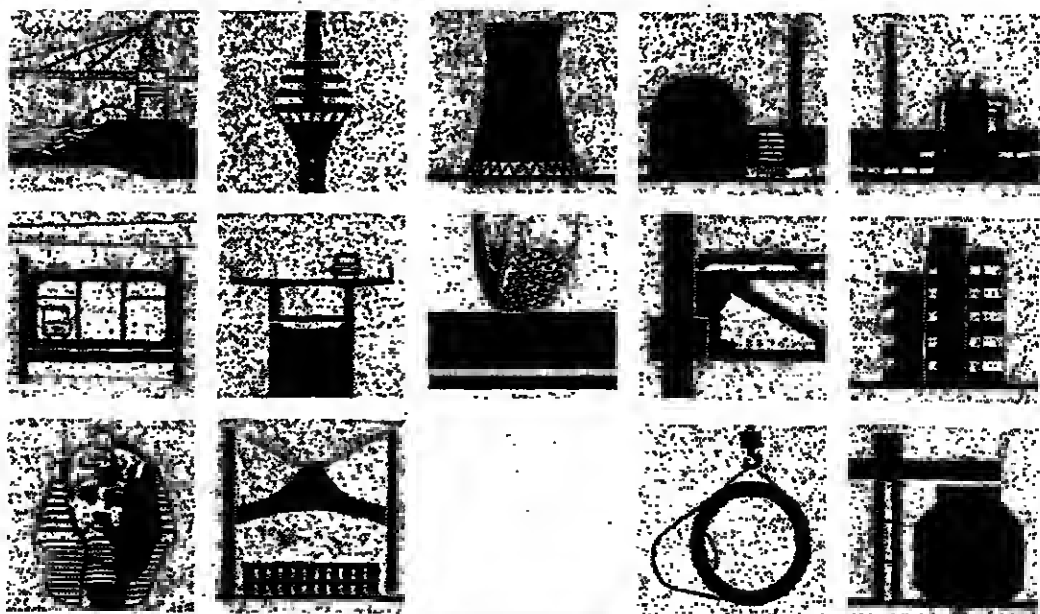
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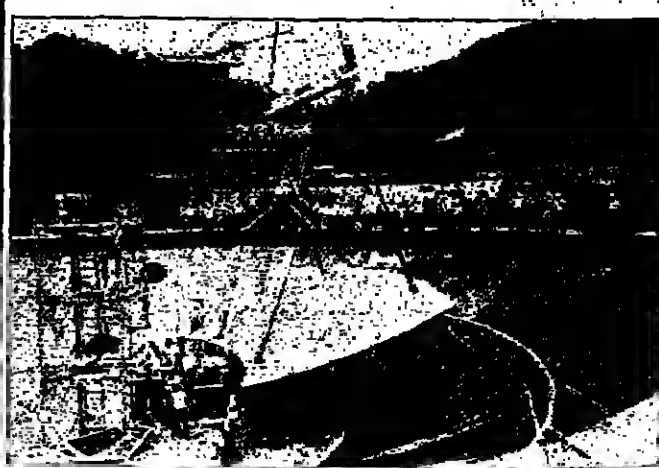


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LATIN AMERICAN NUCLEAR TECHNOLOGY

Argentina: Steady Progress Amid National Turbulence

By Jose Mirabelli

BUENOS AIRES — Argentina's nuclear development program, the oldest in Latin America, has been an island of relative calm and sustained effort in a 30-year period of political turbulence and economic instability.

Argentina has had a 370 megawatt reactor operating with high efficiency since 1974. Two 600-megawatt reactors are now in construction, and feasibility studies have begun on a third. By 1997, two more are to be put into operation. Fuel components for these plants are now being produced on an industrial scale employing Argentine technology. A heavy-water plant is being installed. Since 1958, experimental reactors have been built here for research and isotope production.

This picture of achievement contrasts with the recurrent political and economic crises of recent years in Argentina. Since 1950, the year in which the Argentine Atomic Energy Commission, known as CNEA, was established, there have been four military overthrows of elected governments, as well as numerous military resurgences. There have been 15 presidents, on an average of one every two years. Nine were put in power by the armed forces.

However, the development of CNEA in this period escaped instability. In a rare situation, it was able to develop a continuous and coherent policy and kept free of institutional upheavals and outside pressures. In 32 years of existence, CNEA has had only four presidents.

From the start, the scientists working in CNEA programs adopted a work method that sought to avoid the uncritical absorption of foreign technology. They emphasized adaptation to local conditions and self-established procedures.

At the same time, they sought to bring private entrepreneurs into profitable aspects of the nuclear industry, such as fabrication of nuclear fuels and engineering for nuclear reactors to be built in the country. In 1962, CNEA created the Industrial Technical Assistance Service, known as SATI, as a way of transferring technology to the private sector.

There are now more than 20 Argentine private companies taking an active part in the construction of power plants under way and in engineering and architecture for those under study. These companies have a "know-how" in industrial engineering and an administrative-financial capacity that provides for the industrial operation. This permits CNEA to concentrate on the development of new technologies.

The latest national nuclear plan was announced in 1977. It largely ratified the policies that had been fol-

lowed until then, and it projected long-term policies and goals practically to the end of the century. But in two important respects, it broadened the earlier nuclear programs.

First, CNEA authorized the simultaneous construction of more than one nuclear power plant, instead of the earlier one-by-one approach. This had significant implications for industrial procurement in Argentina.

Second, CNEA set aside the criteria of turnkey projects in favor of stimulating greater participation by national firms in nuclear technology, engineering, and industrial components. The goal was to achieve a progressive autonomy of decision in all aspects of nuclear development.

The general guidelines of the Nuclear Plan are to stimulate scientific, technical and industrial competence for peaceful uses of nuclear knowledge, thereby making use of Argentina's human and natural resources in the nuclear field to contribute to national development.

More specifically, the role of nuclear power is part of the National Energy Plan. This seeks, through nuclear and hydroelectric power, to reduce the dependence on hydrocarbons and derivative fuels, which currently account for 66.6 percent of all electric power production.

In another key aspect, the present Nuclear Plan maintains the policy decision, originally adopted in 1966, to base nuclear reactor design here on natural uranium, with heavy water coolant, instead of enriched uranium. That decision was based, among other things, on the small number of countries that are commercial sources for enriched uranium and the restrictions that exist on international trade in this product.

Argentina has sufficient uranium reserves in its own territory, estimated by CNEA at 30,000 tons of yellowcake uranium oxide, to satisfy the fuel demand of nine 600-megawatt reactors for 30 years of useful life. The heavy-water technology that has been adopted successfully here provides for plutonium recycling and the use of thorium in fuel elements, which would extend the useful life of the present technology even further than the 2050 date based on present uranium reserves alone.

In pursuing its nuclear plan, CNEA has been able to maintain a high priority to allocation of government funds, despite the growing economic crisis. As an autonomous state enterprise, dependent on the executive power, it has received in that last three years a budget allocation averaging \$1 billion annually. In addition, CNEA has some income from services sold to Argentine industry and technical programs in other Latin American countries.

CNEA has been able to retain its cadres of specialized nuclear engineers and technicians. It maintains special teaching and research institutes, such as Bariloche Institute in Bariloche, which offers advanced degrees in nuclear engineering and a doctorate in nuclear physics, and the Central Atomic Bariloche, which does scientific and technological research.

The first nuclear power plant in Latin America began operating in 1974 at Atucha, a town in the pampas 100 kilometers from Buenos Aires. Atucha I has operated with a very high rate of efficiency, measured by the present load factor of 91 percent, and the cost of a kilowatt hour ranks among the lowest in the world.

During the first semester of this year, Atucha I generated 1,511,790 megawatt hours (62 percent of the annual goal). This represented 8.3 percent of all electric power produced, totaling 17,732,631 megawatt hours. At this time, 65 percent is produced from petroleum derivatives and coal.

At the same site, a second power reactor, Atucha II, with 600 megawatts, is under construction. The architectural-engineering firm directing this project is ENACE S.A., which is a joint Argentine-West German company in which CNEA holds 75 percent and Kraftwerk Union (KWU) 25 percent. The design of this reactor is based on KWU technology, and the base for the metallic vessel holding the reactor core is being made in Brazil by NUCLEP, a joint Brazilian-West German venture, under a KWU technology transfer. It may be ready by 1988.

At Embalse, in the province of Córdoba, another 600-megawatt reactor station is almost finished and should be in operation by next July. This is a CANDU reactor based on Canadian technology, but CNEA has acted as prime contractor for construction of the nuclear sector and many Argentine industrial firms played a role in engineering and manufacturing components. CNEA officials say this has added greatly to local know-how, which will be used increasingly for the execution of four more similar power stations to be built by the end of the century. The same companies that worked at Embalse will be involved in the fourth nuclear station, due to be delivered in 1991.

Another major development is the acquired capacity to design and produce nuclear fuel elements on an industrial scale. After three decades of work perfecting the industrial technology, the basic physics, the metallurgy and uranium prospecting and mining, Argentina inaugurated this year a nuclear fuel factory that has begun to supply Atucha I with uranium fuel rods.

This factory is at the Atomic Center at Eziza, in the province of Buenos Aires. It has a covered surface

of 11,600 square meters and is operated by a joint company formed between CNEA and Argentine private capital called CONUAR. It is designed to supply all the nuclear power reactors that will be built.

Based on the power capacity of Atucha I, Embalse and Atucha II, the fuel element factory output will make possible the production of 11.5 billion KWh a year. This will require only 320 tons of uranium and 35 tons of zircaloy, the metallic container for the fuel elements.

This plant, which is the first of its kind in Latin America, was designed and constructed by CNEA scientists and technicians, employing a process developed in Argentina. In other CNEA centers, such as the Sierra Pintada uranium mine, processes have been developed to produce uranium dioxide, zircaloy tubes and other elements necessary for an autonomous fuel cycle.

In order to guarantee supply of heavy water, the coolant and moderating element used in the natural uranium reactor here, Argentina signed a contract with Solser, the Swiss nuclear technology firm, for construction of a plant here with an annual capacity of 250 tons.

CNEA is also preparing a reprocessing facility, that would extract plutonium from irradiated fuel elements and separate highly toxic wastes for secure storage. The Eziza atomic center laboratories have already operated pilot projects in reprocessing with a reactor designed in Argentina.

Argentina's determination to go forward with a reprocessing facility and heavy-water plant, which is regarded as sensitive technology, led to serious discussions with the International Atomic Energy Agency over the application of safeguard inspections of nuclear activities in Argentina.

Like India, Brazil and South Africa, among others with major nuclear development programs, Argentina has refused to sign the Nuclear Non-Proliferation Treaty. The policy here is to accept safeguard inspection only when the technology involved has been imported, and not generated domestically.

Retired Vice Admiral Carlos Casiro Madero, who is CNEA's president, recently summed up Argentina's objections to the restrictive aspects of international nuclear safeguards on technology transfers. "Such controls must not be used as a means of blocking technological development, which tends to create or maintain an industrial hegemony and exercise a monopoly over the sources of energy of the future," he said.

Brasilia-Bonn Pact Is One of World's Largest and Most Controversial

(Continued from Page 55)

curate determination of the country's hydroelectric potential and the long-distance transmission of that power. Brazil's system currently includes the world's largest hydroelectric complex, the \$10-billion Itaipu plant on the Paraná River between Brazil and Paraguay.

Although the German government was heavily involved in securing the contract and in the initial licensing of nuclear exports to Brazil, only the Ministry for Research and Technology remains directly involved.

A German official said changing attitudes toward the exchange of nuclear know-how, and especially

that taking place in Brazil, have long since removed the subject from the main political arena.

The Ministry for Research and Development participates in a co-operative research effort with Brazil, in some training activities and as a monitor of nuclear exports. The ministry's monitoring duties are one way in which the German government says it guards against the misuse of nuclear knowledge.

Another safeguard, and one that is mentioned often in reassuring the rest of the world that West Germany is taking "extreme caution" in its nuclear exporting business, is a bilateral agreement signed by West Germany, Brazil and the International Atomic En-

ergy Agency in Vienna in 1976. The agreement calls for the inventory of all technology being exported to Brazil and for that agency to periodically inspect all nuclear construction sites in that country.

As many as 35 German companies have been thus far involved in the German-Brazilian deal — at a time when domestic nuclear construction has been at a virtual standstill due in varying degrees to government restrictions, a complicated licensing procedure and the efforts of one of the world's most outspoken anti-nuclear lobbies.

There are signs, however, that domestic nuclear construction may soon see an upswing. Kraftwerk

Union, a subsidiary of Siemens, has played the principal role in the knowledge transfer and actual construction. Although a handful of the large German nuclear firms have had a hand in the venture, Kraftwerk Union and its subsidiaries have worked closest with the Brazilian government-operated firm of Empresas Nucleares Brasileiras, S.A., known as NUCLEBRAS.

Basic to the transfer of know-how and the entire project, is Kraftwerk Union's training programs operated in cooperation with German research centers and German utilities. The company also has a nuclear power plant simulator in Kaulstein in which con-

trol-room operations are demonstrated.

"The program involves not only the training of engineers and power plant operators but also the blue-collar plant workers," a company spokesman said. "We have trained more than 100 people in the last three years."

The transfer of technology was and still is scheduled to be completed by 1990. The timetable for the construction end of the German-Brazilian deal is far behind schedule. It called for the start-up of four nuclear power plants by 1986 and four by 1995.

In 1975 Brazil contracted for two power plants, signed letters of intent for two more and made a ver-

bal agreement to build four more.

The last four plants, however, will not necessarily be built in cooperation with German firms, the Ministry for Research and Technology said. Because of the current agreement, German firms might have the upper hand, but those four plants, if they are ever built, will be open to bidding on the world market.

Angra-2 and Angra-3, the first two power plants to get under way in the cooperative effort, are currently under construction by Kraftwerk Union and NUCLEBRAS next to the Westinghouse-built Angra-1 plant on the Angra dos Reis Bay, about 200 miles south of Rio de Janeiro.



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COBRASMA: TECHNOLOGY IN THE NUCLEAR ERA

Cobrasma is one of the companies selected to manufacture heat transfer equipments for the Brazilian nuclear program, such as: heat exchangers, moisture separators and steam reheaters, surface condensers, and utility steam generating systems, for which it was certified by KWU, TÜV and IBQN. By establishing frequent contacts with subsuppliers, it aims at increasing the amount of locally-made items used for the manufacture of equipments according to the stringent criteria required (RC-2 to RC-5). Aware of the importance of its participation in designs involving safety and accuracy, Cobrasma has already established the quality assurance system required for the supply of nuclear equipments.

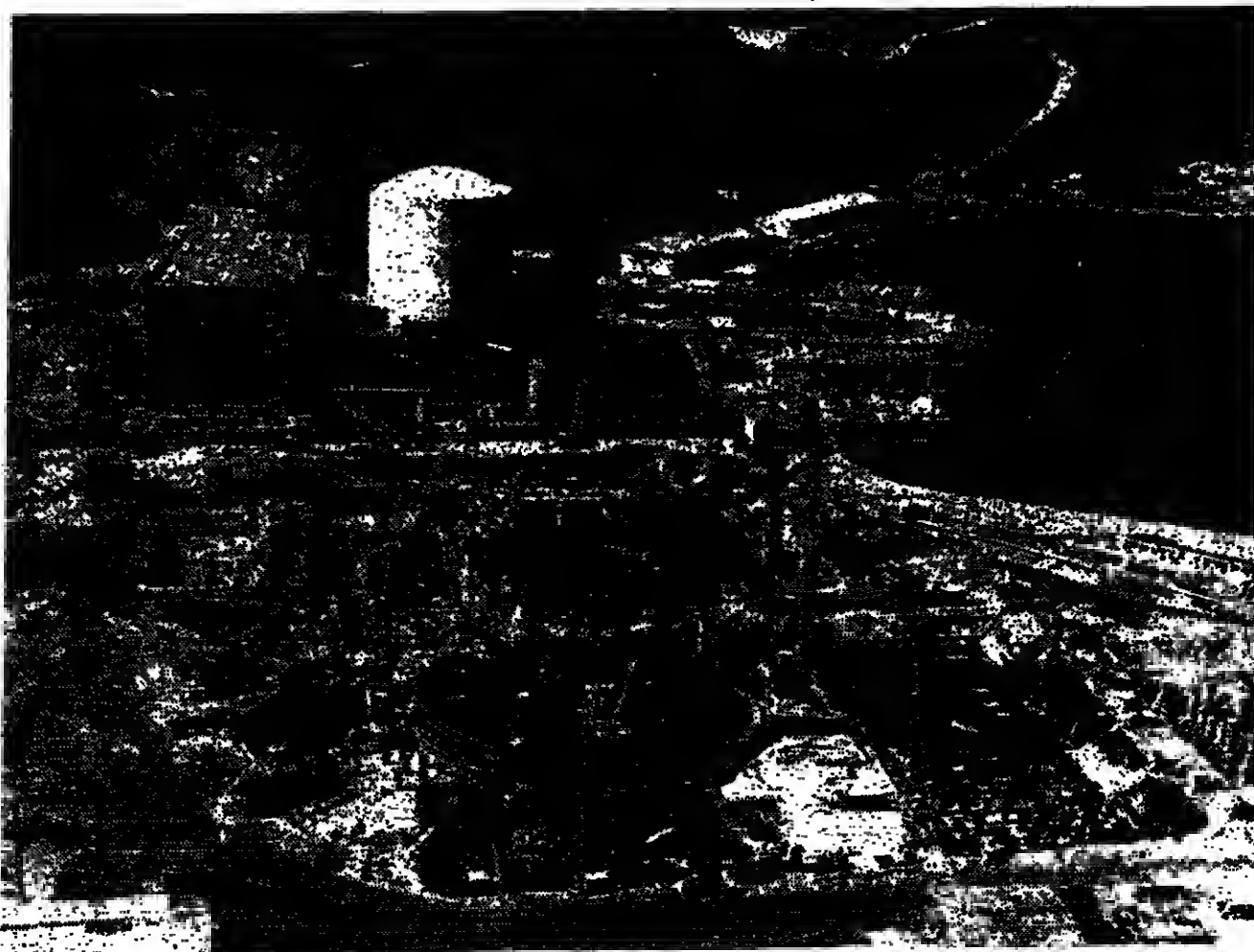
ODEBRECHT'S IDENTIFICATION WITH BRAZILIAN NUCLEAR TECHNOLOGY

Upon starting its nuclear civil construction activities in Brazil in 1972, Odebrecht was aware that this pioneer spirit was not just broadening its experience in industrial construction and specialized technology, but also (and chiefly) investing in and preparing for the future market of nuclear technology.

With the execution of the civil works on the first nuclear power plant in Brazil, in operation since 1981, Odebrecht consolidated its decision to gather technology and prepare human resources for this sector.

Unit 1 along with Units 2 and 3 which constitute the first power plants of the Brazil-Germany Nuclear Agreement will form the first great Brazilian Nuclear Complex (the *Admiral Alvaro Alberto Nuclear Complex*), located in the Municipality of Angra dos Reis in the State of Rio de Janeiro, with a capacity of 3,226 MW.

Unit 1 was built for *Furnas Centrais Elétricas S.A.*, with technology and equipment supplied by Westinghouse. The structural design was the work of Gibbs and Hill, with *Promon* participating in the detailing. The technology transfer of the civil works to Odebrecht was undertaken by J.A. Jones. Unit 1 presents a PWR



reactor with a capacity of 626 MW; it was built on direct foundations and sliding forms were used to execute the reactor building.

Unit 2 is being built for *Nucon (Nuclebrás Construtora de Centrais Nucleares)* with KWU technology and equipment; when ready, it also will be operated by *Furnas*. The design was entrusted to

Nuclen (Nuclebrás Engenharia S.A.), the detailing of the civil works being the responsibility of *Promon* and *Engevix*. The technology transfer of the civil works is given by

Hochtief.

The great challenge in Unit 2 was represented by its foundations, which were made of deep piles with high bearing capacity, cast in place and drilled to hard bed rock.

Throughout the last ten years Odebrecht has sought to extend its participation in the Brazilian Nuclear Programme by offering its experience to other works necessary for the complete fuel cycle. In this context Odebrecht has recently concluded the civil works for the First Cascade of the Uranium Enrichment Plant in Resende. The function of this unit will be to prepare the fuel element to feed the reactors of the nuclear plants.

With its 37 years of experience, its training and tradition in industrial works, its growing participation in engineering projects overseas, besides a decade of active service in nuclear civil works, Odebrecht feels fully qualified to offer a real contribution to the setting up of ventures of this scope and speciality.

ODEBRECHT
CONSTRUTORA NORBERTO ODEBRECHT S.A.



LATIN AMERICAN NUCLEAR TECHNOLOGY

U.S. Priority on Nonproliferation Shifts Downward in Reagan Administration

By Carroll E. Watts

WASHINGTON — President Jimmy Carter suffered the anger of the United States' closest allies and the possible loss of several billion dollars in nuclear export sales in order to wage war on nuclear weapons proliferation. Because he perceived the spread of nuclear arms as posing the threat of annihilation of mankind, nonproliferation occupied a premier position in his foreign policy.

By contrast, President Ronald Reagan has attempted to take the issue out of the newspaper headlines and put it into the hands of behind-the-scenes bureaucrats and diplomats. They have pursued a course focused primarily on maintaining U.S. prominence in world nuclear commerce.

Nonproliferation remains a concern. In many respects, Mr. Reagan continues to build on the policies of Presidents Carter and Gerald Ford. But, for Mr. Reagan, the East-West conflict looms as the most significant issue on the foreign policy front. Nuclear proliferation has had to take its place further down on the agenda.

Beyond the shift in priorities, the Reagan administration has instituted a number of specific changes in U.S. policy on the export of nuclear materials, technology and know-how. Flexibility has been permitted in the stance the United States takes in negotiations with foreign countries. Within the context of existing U.S. law, Mr. Reagan has relaxed regulatory restrictions on exports.

The Reagan administration has moved away from Mr. Carter's confrontational approach of unilaterally pressing friend and foe alike to halt the trade in technologies and materials that can be used in weapons production. As James Buckley, undersecretary of state, said in June 1981, "We simply cannot afford to penalize the trustworthy and responsible nations of the world because of the nuclear adventurism of a few countries." Instead, the Reagan administration said it would rely more on inter-

national safeguard regimes, such as the International Atomic Energy Agency.

The administration has changed export policy to allow the United States to discriminate between those nations it believes can be trusted with nuclear technologies, such as Japan, Western Europe, Australia and others who evidence varying degrees of proliferation risk. For the trusted few, blanket approvals of retransfer of U.S.-origin materials are being offered, along with possible sales of sensitive enrichment and, reportedly, reprocessing technologies.

For the other nations, concessions have been made as well. Sales to Argentina and South Africa of so-called dual-use equipment, which can be used in commercial and weapons applications, have been approved. Efforts to force other nations to accept rigorous safeguards have been set aside. For example, the United States agreed to forgo penalty claims against Brazil when that nation decided to turn to other sources of enrichment rather than accept a U.S. demand for stricter safeguards.

Commenting on the Brazilian decision in December 1981, Assistant Secretary of State James Malone said: "The case of Brazil casts an informative light on the dynamics of the flexible approach we have adopted. . . . Our objective has been to keep options open on both sides as we attempt to find suitable arrangements that would serve our nonproliferation goals while establishing a framework that would permit nuclear cooperation between the two nations." Critics, such as Sen. John Glenn, Democrat of Ohio, argue that the administration has all too often made concessions with little to show in return.

In another area, the Reagan administration has launched a campaign to restore plutonium to a position of respectability as an energy source. It has lifted the ban on commercial reprocessing in the United States and said it would not interfere with the breeder reactor and reprocessing activities in countries with low proliferation risk.

But it appears clear that the fundamental change in U.S. policy has been the resurrection of what one U.S. writer called the "commercial imperative" in nonproliferation policy. While paying at least lip service to the need to stop the spread of nuclear weapons, administration officials have repeatedly stressed the need to re-establish the United States as a competitive, reliable supplier in the world nuclear trade. Without a strong export position, the administration argues, the United States loses the leverage it needs to prevent proliferation. This message warms the heart of the domestic industry, which claims that export restrictions in the last five years have cost it \$9 billion in lost foreign sales.

The Reagan administration, however, has shown little willingness to subsidize exports. It has pressed for cutbacks in Ex-Im Bank funding and searched for ways to put commercial reprocessing in the United States on a private footing.

To some observers, the initial Reagan approach to nonproliferation seemed to echo the early 1970s when these concerns were viewed with relative complacency. Critics pointed to Mr. Reagan's comment in January 1980, which was subsequently retracted, in which he said, "I don't think it's any of our business" if other nations develop nuclear weapons.

As the Reagan team prepared to take office, a transition paper prepared by an attorney, James Malone, bolstered this view. Mr. Malone, whose law firm represented foreign and domestic nuclear energy clients, argued that sanctions and denial of supplies had proved ineffective in the attempt to stop the spread of nuclear weapons.

In October 1981, information obtained by The Washington Post showed that Mr. Malone was pushing for, among other things, nuclear export policy to be centralized in the State Department rather than in the Nuclear Regulatory Commission. Congressional critics feared that the State Department would review the export licenses with an eye toward the diplo-

matic consequences rather than the potential for proliferation. Mr. Malone subsequently found his credibility damaged in Congress. Then secretary of state, Alexander M. Haig Jr., dissatisfied with Mr. Malone's performance, shifted the lead in nuclear policy matters to the undersecretary for management, Richard Kennedy, in March 1982.

Mr. Kennedy, a former Nuclear Regulatory Commission with a strong background in nuclear policy matters, took such an active role in the area that he came under criticism for neglecting the management of the State Department. In September 1982, the secretary of state, George P. Shultz, named Mr. Kennedy as ambassador at large with responsibility for nonproliferation policy. In a rare appearance for a secretary of state, Mr. Shultz personally announced the appointment with the comment that nonproliferation is "of such immense importance that we must have somebody pay attention to it full time."

As a practical matter, nuclear export policy during this period has not deviated too far from the original outlines drawn by Mr. Malone. For Japan and Western Europe, the administration has put together a proposal to allow blanket, rather than case-by-case, approval of the retransfer of U.S.-origin materials. Australia has received commitments from Mr. Reagan that the United States is willing to sell it sensitive gas centrifuge enrichment technologies.

Even countries with a recognized degree of risk have received the benefits of relaxed export policy. In a direct reversal of the Carter position, James Edwards, the energy secretary, authorized the export of a Fashco Co. gas turbine system that will control Argentina's heavy water plant at Arroyitos. The unit is actually being sold to the Swiss firm of Sulzer Brothers for delivery to Argentina. South Africa, during a one-year period, received approval for purchases of five separate items of dual-use technology.

Diplomatic forces have been mobilized to

support U.S. efforts to win major nuclear supply contracts. Mr. Haig included a discussion of nuclear matters during his visit to Mexico in late 1981. At that time, Mexico was considering a second two-unit nuclear station. It subsequently was canceled because of the country's economic condition.

Mr. Reagan's major public statement on nuclear exports came on July 16, 1981. He called a shift in emphasis toward pursuing nonproliferation through improving regional security and global stability to reduce the motivation to obtain nuclear weapons. To restore the United States as a reliable supplier, Mr. Reagan ordered the Nuclear Regulatory Commission and the Energy Department to move expeditiously on export license requests.

While critics noted the lack of enforcement or sanctions in the policy statement, some were encouraged that it was moderated from the initial views expressed by Mr. Malone. Some attributed the increased moderation to the Israeli attack on Iraq's research reactor that took place in June. The attack intensified public concern and interest in nonproliferation.

In general, however, the Reagan administration has conducted its export policy behind the scenes. Its plan to allow programmatic arrangements for reprocessing and plutonium use has remained a classified document. The administration has decided to amend the so-called "trigger list," maintained by the London Suppliers' Group, to delete certain sensitive items that are restricted from sale to countries based on their proliferation risk.

What the administration has not attempted is a wholesale legislative revision of the Nuclear Nonproliferation Act of 1978. While this law contains the restrictive export policy that ties the hands of the administration, an assault on the Act would almost certainly fail in Congress. Within Congress there remains a vocal and powerful bipartisan view that nonproliferation concerns should be superior to com-

mercial interests. Sens. Glenn and Charles H. Percy, Republican of Illinois, share similar concerns on the issue and a powerful subcommittee position from which to practice it.

In the House of Representatives, retiring Congressman Jonathan B. Bingham of New York has kept up the pressure on administration export policy. Mr. Bingham pushed legislation out of the Foreign Relations subcommittee in September. One provision would have restricted the Energy Department's ability to authorize firms to engage directly or indirectly in the production of plutonium and enriched uranium outside the United States. The bill also would have tightened restrictions on the export of highly enriched uranium and set criteria for subsequent arrangements to reprocess U.S. exported fuel. The bill did not become law but it does frame the debate that is likely to continue next year.

The Energy Department has responded to this pressure by proposing to withdraw the general authorization for exports of sensitive nuclear technology to all countries that have not agreed to full-scope safeguards or become signatories to the Nuclear Nonproliferation Treaty. Some 63 countries would be placed on the list, including Argentina, Brazil and Chile. While the change would require an Energy Department review of the authorization, generally it is expected that they would be permitted as in the past.

Currently, a significant issue is U.S. unhappiness with the recent denial of credentials to Israel by the International Atomic Energy Agency. The Reagan administration is in a ticklish position in that it has emphasized its reliance on the agency rather than unilateral pressure to carry out its nonproliferation goals. However, the situation is not likely to have much effect on the practical implementation of administration policy toward nuclear exports. In general, flexibility and efforts to reduce regulatory restrictions are likely to be maintained.

Argentina, Brazil End 'Race,' Now Cooperate

(Continued from Page 55)

parent than they were in the past, enabling both countries to realize that neither would have an advantage in a nuclear race.

Neither Argentina nor Brazil has signed the Nuclear Nonproliferation Treaty. They consider that the treaty, which uses safeguards to prevent the spread of nuclear weapons capability, is not so much a treaty for nonproliferation per se, but more for preventing acquisition of nuclear weapons by states other than "the five": the United States, the Soviet Union, Britain, France and China. For the Nonproliferation Treaty members, the "horizontal" proliferation is the danger to be prevented, while the

"vertical" one continues to grow at full speed. But others see it as a discriminatory treaty. Its greatest weakness, in the words of the Stockholm Peace Research Institute, is "the imbalance between the obligations of, and the benefits for, the non-nuclear weapon parties — the 'have-nots' — and those of, and for, the nuclear weapon parties — the 'haves'."

The United States is not pleased by the refusal of Argentina and Brazil to join the treaty nor by their policies of seeking full autonomy in nuclear energy, especially in the fuel cycle. It has applied heavy political pressure on Brazil, as in the case of its direct opposition to a very comprehensive West

German-Brazilian nuclear deal, and on Argentina, as witnessed by its denial to deliver enriched uranium for the research reactors now in operation in the country.

Both countries have reacted vigorously against such pressure and presented their cases in various international forums. The 1980 Argentina-Brazil cooperation agreement must be seen as a joint answer to the U.S. action. Its text clearly states that "all countries have the right . . . to full command of nuclear technology."

Some of the more interesting features of the agreement include:

• Argentina will supply, as a loan from the Atomic Energy

Commission to NUCLEBRAS, 240 tons of yellowcake uranium oxide of nuclear quality, produced in Argentina. The first batch of 120 tons was delivered in 1981 and the second will be supplied before the end of 1982. The payment of this loan will be in kind: during 1983 and 1984 NUCLEBRAS will deliver to Argentina 240 tons of Brazilian yellowcake plus an amount corresponding to 6 percent interest.

• The commission will also sell NUCLEBRAS zirconium tubes, rods and other components produced in Argentina, of a quality required for the manufacture of fuel elements for the Brazilian power reactors.

Debate Continues to Surround Brazil's Leap Into Full-Scale Nuclear Energy Development

By Charles Thurston

SAO PAULO — There is more public debate over Brazil's nuclear development program, with West German technological and financial assistance, than has been aroused by any other major economic program undertaken here in the last decade.

The critics cover a wide spectrum. Some are scientists who say Brazil is not developing an independent technology. Others are ecologists who fear the effects on man and nature of nuclear power. Strong opposition has come from public power companies that see their own favored hydroelectric or coal-fired power projects threatened by the rise of the nuclear sector.

Above all, there is a widespread feeling that Brazil cannot afford to spend, at a time of serious economic recession, the billions of dollars for nuclear power that could be applied to relieve pressing needs in nutrition, health, education and housing. This atom-versus-butter argument is very popular now with opposition politicians who are running for office in elections Nov. 15. In major industrial states, many have made opposition to the nuclear program part of their campaign, identifying this as the most heartless folly of the military, who have been in power for 18 years.

The debate is more than an election stunt, however. There are serious doubts over what the full cost will be of constructing eight 1,300-megawatt power reactors, a full nuclear fuel cycle, including enrichment and reprocessing of spent fuel. NUCLEBRAS, the state company running the program, says it will cost no more than \$25 billion. A senate investigation this year said at least \$30 billion would be required. Some critical nuclear energy analysts talk of \$36 billion.

After lengthy hearings, the Senate approved a report backing the decision of Cesar Cals, the minister of mines and energy, to maintain the nuclear energy target of eight reactors in operation by the year 2000. But the pace of the start-up of reactors has been slowed, with only four scheduled for operation by 1995 and four more by 2000.

The report said: "With Brazil facing the prospect of an inevitable and irreversible use of nuclear energy, the disbanding of technical cadres we have formed would have a disastrous effect on the transfer of [nuclear] technology. For that reason, we support continuity of the nuclear program."

This does not satisfy the powerful propo-

nents of hydroelectric power, who claim vast undeveloped potential exists in the Amazon region at generating costs lower than nuclear power. But electricity transported from the Amazon region to the main consumption areas of the industrial south has to travel 1,550 miles (2,500 kilometers) with high loss in transit.

The debate rages on, with conflicting estimates over future electricity demand, relative costs of power alternatives, and the dangers of nuclear pollution. There is no such thing as a "green" political movement in Brazil, but there are small, peaceful political demonstrations by pickets at times against nuclear power.

Both the reactor and fuel-cycle side of the NUCLEBRAS-West German program have long been criticized by some national scientists who call for a less costly and more nationally based program of research and development. They have capitalized on nationalist political sentiment in Brazil, which often labels foreign technology packages as the equivalent of selling out the country's own scientific abilities.

Prof. José Goldemberg, a nuclear physicist at the University of São Paulo, which has a research center, INEP, financed by the state government, told the Senate hearings that "the technological transfer model employed by NUCLEBRAS never did justice to the scientific, technical or industrial capacity that exists in Brazil." He said that NUCLEBRAS should have given work to IPEN and other research institutes for developing a Brazilian process for uranium enrichment and preparation of uranium hexafluoride, rather than going to the German and French companies for the technology. Studies in these areas are incipient and barely funded in Brazil.

Prof. Goldemberg has called for a suspension of reactor construction until an independent examination can be made of the NUCLEBRAS-West German decision to follow an experimental jet nozzle enrichment system as a key part of the fuel cycle.

President João Baptista Figueiredo has made a public commitment to start the first four reactors under the West German agreement during his term in office, which ends in early 1985. Contracts have been signed with Deutsche Kraftwerk Union (KWU), to supply reactor components for the first two, which are going into an established site at Angra dos Reis, Rio de Janeiro state. The other two are scheduled to go into a site at Pôrto Alegre, on the coast of São Paulo state.

In the São Paulo election campaign, the

leading opposition candidate for governor, André Franco Montoro, who stands a good chance of winning, has said he does not want nuclear reactors in the state. His advisers, who include professors at INEP, have said there may be legal action to halt authorization of that site. NUCLEBRAS has already signed numerous agreements with the municipal authorities and has begun site preparations.

Prof. Goldemberg is of the opinion that NUCLEBRAS is "fighting for its life" to maintain the pace of continued reactor construction and has only initiated preparation of the Pôrto Alegre site for the Ignape I and Ignape II reactors in an effort to convince the German partners that everything is "business as usual." He predicted that there would be lengthy negotiations on the reactors with the new state government after the election, but he doubted that legal action would block construction since "it's never been done here before."

DKW's position as supplier is patient and confident. Wolfgang Breyer, the company's spokesman in Brazil, pointed out that even if the reactor construction timetable has been set back a year or two, the slowdown can be compensated for in the future if there is an economic upturn and greater electricity demand. He pointed out that the development of the fuel cycle side of the agreement is not being slowed down by the Brazilians.

In May, the first stage of the fuel cycle got under way when the Pôrto Alegre uranium mine and concentrator began producing yellowcake. On Oct. 20, Mr. Figueiredo inaugurated the fuel element plant at Resende, which is the last stage for producing fuel that goes into the reactor. Yet, between these two stages, the conversion and enrichment of uranium also needs to take place.

NUCLEBRAS will acquire a uranium conversion facility (yellowcake into gaseous uranium hexafluoride) from the French firm, Pechiney Ugine Kuhlmann, and expects to have this in operation in 1984. Meanwhile, it is buying enriched uranium oxide from URENCO, the West German-Dutch-British consortium, based on Brazilian yellowcake, to prepare fuel elements.

But the key operation that has to be developed is the enrichment plant with a new technology of uncertain cost that has not been tried on an industrial scale before. There is scope there for far more debate, as the NUCLEBRAS gamble develops.

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- Planning and development of nuclear systems and installations

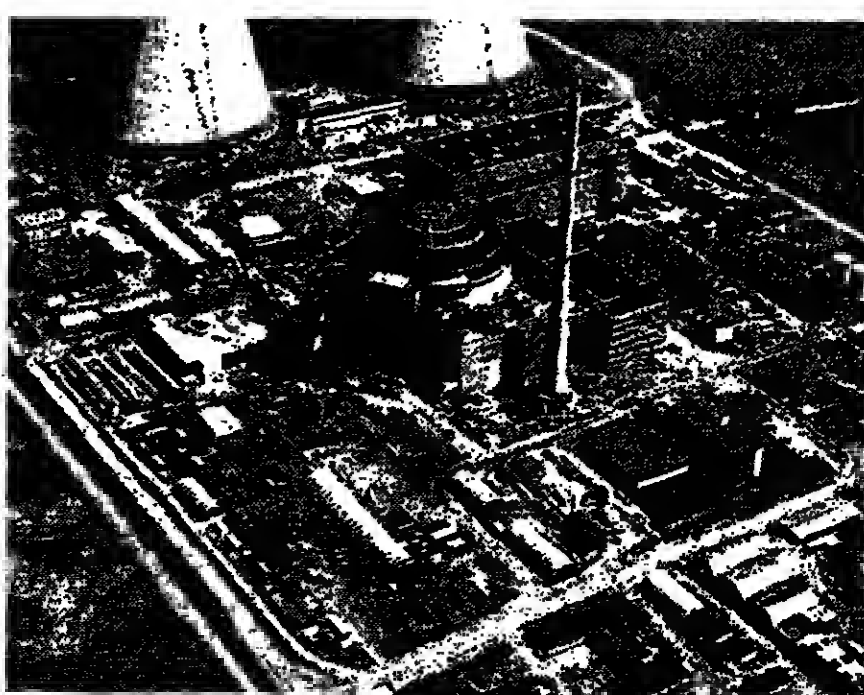
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ARTS / LEISURE

Prices Strong at Two Maeght Auctions in Paris

By Soren Melikian
International Herald Tribune

PARIS — Drouot had its first serious test of the new auction season this week. It started with art objects acquired by the late Aimé Maeght, France's leading dealer in modern and contemporary masters since World War II, and continued with paintings and carvings that he had handled at one point or another.

The second sale, on Wednesday, was quite an achievement, with total sales of 25.9 million francs (\$3.6 million) — no painting failed to reach its reserve price. It is an extraordinary record for the season and shows the Paris auction market to be much stronger than professionals had anticipated.

The two-part test had begun in a lower key. The collection of art objects was sold Monday by Jean-Louis Fiechter with the assistance of Jean Roudouff, who had cataloged the pottery and glass from the ancient world as well as primitive art, and of Michel Beurdeley, who was responsible for the bronzes from the ancient Middle East, the pottery of Islamic art and isolated items from the Far East. Despite the extraordinary range of cultures and periods, a link was perceptible, although it cannot be easily described in visual terms. Somehow, all the items could be seen to match one aspect or another of the modern repertoire of forms. Displayed on the shelves and stands of a single Drouot room, there was a cross section of what André Malraux dubbed the "imaginary museum" of world art as seen by the modern eye.

The Greek pottery was not from Attica in the classical age but from fourth-century-B.C. Onatibia and other semi-barbaric Italian centers — sketchy, clumsy, Pre-Columbian art was represented by terra-cotta figures from the Naxos culture in Mexico, done sometime between 100 B.C. and A.D. 250 — mon-

strously fat feminine bodies with puny arms, or Mazzeola stone figures of about the same period with bodies and faceless heads hewn in a cubistic style. The most striking was an elongated bronze figure from second-millennium-B.C. Syria reminiscent of some of Alberto Giacometti's "walking men." The similarity is hardly accidental. Di-

es, other things being equal, fetched by some of the lesser items. In the context, these were seen by those attending not as unimportant collectibles but as so many sources of inspiration for important modern sculpture. For instance, a small green stone Mazzeola statuette 12 centimeters (about 4.7 inches) high fetched 11,420 francs (about \$1,585) — twice the estimate. A small bronze of two standing figures with big round heads, huge hollow eyes and dwarfish stumps for arms went up to 10,350 francs, twice what had been expected for this second-millennium-B.C. piece from Syria. No doubt a literary title — "Maternity" — given by Malraux, changed it into a relic of the "Imaginary Museum of World Sculpture," as the French writer titled one of his art books.

When it came to the more important pieces, there were bought at going market prices and not a centime more, because motivations of a literary order no longer played a role. The best two African masks were a Baule piece looking like a funny face out of one Max Ernst's Surrealist portraits, and a Togo mask surprisingly reminiscent of Kandinsky's "sailing boats" series superimposed with a human face. Both went to the auctioneer, Guy Loudmer, a noted collector of African art, for 35,770 francs and 44,570 francs respectively. Neither could be called expensive. Nor was a fine, if damaged, reliquary carved as a standing figure, from the Pabouin culture in Gabon, which was about right at 176,570 francs.

The same is true of most of the pieces that were truly important from the collector's standpoint. A remarkable second-millennium-B.C. bronze figure from Syria, to which parallels may be seen in the Aleppo Museum and in the Louvre, brought 99,000 francs, which given its museum quality and rarity strikes me as well below the potential maximum. Bronze disease and very minor damage explain the relatively moderate figure.

Two days later, with Loudmer conducting the proceedings, it was

not Maeght's private objets d'art, but modern art that had involved him as a dealer at one time or another. Contrary to Drouot's usual procedure, Loudmer had not called in an expert. Authentication was not required. As for estimates, the French auctioneer knows his job as well as the next man.

Prices closely matched estimates in both lower and upper brackets. For example two 1974 gouaches by Alexander Calder, both 75 by 110 centimeters, went for 19,270 francs and 21,470 francs respectively, compared with estimates of 20,370 to 22,570 francs for each.

More astonishing was the performance in the upper financial bracket. Few of the pictures offered could be seriously termed unobtainable. They were typical rather than admirable, and had it not been for the name of the Galerie Maeght, of which Loudmer made the most, they would hardly have drawn so much attention. Seen together they rather gave the impression of coming straight from a dealer's stock, which in essence is what they were. A portrait of Diego Giacometti by his brother Alberto went for 1,430,570 francs, followed seconds later by a second portrait in oils at 1,210,570 francs — slightly disappointing. Loudmer commented, which is surely an exaggerated fit of modesty. But that was nothing compared to the auction record for a Giacometti bronze, "Annette VI," done in 1962, which fetched an unexpected 1,815,570 francs.

A 1928 still life by Fernand Léger made 979,570 francs, a little less than had been hoped but Loudmer said without elaborating, "It had been available on the market." And at 3,025,000 francs, the other Léger in the sale, "La belle cycliste," dated 1951, more than made up for it. Even an uninspired Matisse drawing from the "shrub" series nooded to 1,155,570 francs despite an 11th-hour announcement that the French authorities would not allow it out of the country. Loudmer says that this is one of two such drawings still in France and the other, he adds, is in ruinous condition.

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Iwan Tirta works at the delicate art of fashioning batik designs.

Indonesia's 'Ambassador of Batik'

By Vicky Elliott
International Herald Tribune

JAKARTA — Iwan Tirta has spent the last 12 years fighting to put batik, an Indonesian art form, on the map. Some people might think the two already synonymous, but Iwan disagrees. "The Indians have their batik and the Thais did it with Jim Thompson's Thai silk, but we've always been taken for granted. People think of cheap batik, 'something my mother brought back from the colonies,' and that's that, but I want them to sit up and notice."

Success wasn't too long in coming. The queen of Belgium is still wearing two batiks she bought from Iwan in 1974; she wore one to receive the queen of Denmark. Iwan savors the details and keeps scrapbooks recording the visits of Elizabeth II, Betty Ford, Imelda Marcos and Jihan Sada.

But running a cottage industry like his, he says, you have to be able to get on with everyone. "On glittering occasions," (and he insists that batik should be reserved for the most formal of occasions; that wearing a good batik to a disco is sacrilege) "my thoughts always go back to the little people I left behind. Without them, I would be nowhere."

Fashion shows in New York and Tokyo and lectures in London and Paris showing off both Iwan's own haute couture designs and his sumptuous collection of antique batik pieces have changed the picture a little. Batik now seems almost synonymous with Iwan.

A lawyer educated at Yale and the London School of Economics who became Indonesia's envoy to the United Nations, Iwan, as he is usually known, elected to become ambassador for batik when he realized that he wasn't going to make the "pinnacle of the legal profession."

But running a cottage industry like his, he says, you have to be able to get on with everyone. "On glittering occasions," (and he insists that batik should be reserved for the most formal of occasions; that wearing a good batik to a disco is sacrilege) "my thoughts always go back to the little people I left behind. Without them, I would be nowhere."

Success wasn't too long in coming. The queen of Belgium is still wearing two batiks she bought from Iwan in 1974; she wore one to receive the queen of Denmark. Iwan savors the details and keeps scrapbooks recording the visits of Elizabeth II, Betty Ford, Imelda Marcos and Jihan Sada.

At 46, he still has the dry wit of the lawyer, the relish of a well-timed phrase, and he often feels, he says, as if he's back in court. "It's like convincing a jury," he says, looking crisp in an unassuming safari shirt. "There was so much hard work to break the barrier into haute couture."

His latest project is to fly to Tokyo to supervise Indonesia's presentation at a fashion fair. Iwan is skeptical; to him, fashion in Japan is a one-way traffic. "They're awfully tight with their import policy," he says. "They open the tap just a trickle so that it creates an image, but they look at us as amusing and ethnic."

Exceptional pieces — a Javanese princess's bridal gown, for instance — can sell for up to \$1,250, but generally his price tags are less than \$800. "The Japanese go for price," Iwan says. "My dresses aren't expensive enough. If it's expensive, I'll say it is."

Iwan's scholarly grasp of the designs and development of the medium produced what is considered the definitive work on the subject, "Batik: The Magic Cloth," published in 1967. Meanwhile, he is adding his own contributions to an art form that has always absorbed new influences.

His personal batik collection includes examples showing Chinese and Japanese motifs, and even

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Turner Landscape Fails to Sell

Compiled by Our Staff From Dispatches

NEW YORK — The art market suffered its first major reverse of the season Thursday when one of the few J.M.W. Turner landscapes in private hands was offered at auction but failed to sell. Bidding for the "Landscape with Walton Bridges" reached \$1.65 million at Sotheby's galleries but did not reach the reserve set by the seller. The top bidder was not identified.

The painting, executed in the 1840s, was consigned to sale by Catherine Adams Morgan of Eastons Neck, New York, widow of Henry S. Morgan, who was a great-grandson of banker Julius Spencer Morgan. The senior Morgan bought the painting in London in 1887. The last Turner sold at Sotheby's was "Juliet and Her Nurse," a Venetian night scene, which was knocked down for \$6.4 million — the highest price ever paid for a painting at public sale — two years ago.

Record Price for U.S. Gold Piece

An 1870 \$3 gold piece from the world's only complete collection of United States gold coins has been sold at auction for a record \$625,000. "Possessing the 1870 \$3 gold piece is the numismatic equivalent of owning the Mona Lisa," said one expert.

The sale by Bowers and Ruddy Galleries Inc., of Los Angeles, for the owners, Gold Coin Corp. and a

Tempe, Arizona, dealer, brought the highest price ever paid at auction for a U.S. coin, surpassing the old mark of \$287,000.

Two other gold coins went for \$92,500 and \$90,000 respectively.

The \$3 gold piece was purchased by Harvey Stack of the Stack Coin Co. for a client he declined to name. It came from a collection assembled by Louis Eliasberg of Baltimore, who died in 1976.

High Prices for South African Stamps

In London, stamp dealers and collectors crowded into Sotheby's auction house Thursday to bid prices up to 20 times higher than expected for early South African stamps that belonged to the late hotel tycoon, Sir Maxwell Joseph.

The first 650 lots in a two-day sale were all sold for a total of £243,115 (about \$408,433), not counting the 10-percent buyer's premium.

All the stamps were Cape of Good Hope triangulars, eagerly sought classic issues of the 1850s.

Joseph, who died last month at age 62, after building a hotel chain valued at £2 billion, began collecting stamps as a boy and when he was rich, once took over an auction to get what he wanted. He said jokingly that he stopped collecting the triangulars because the only items he lacked were in the Buckingham Palace collection, "and the queen won't swap."

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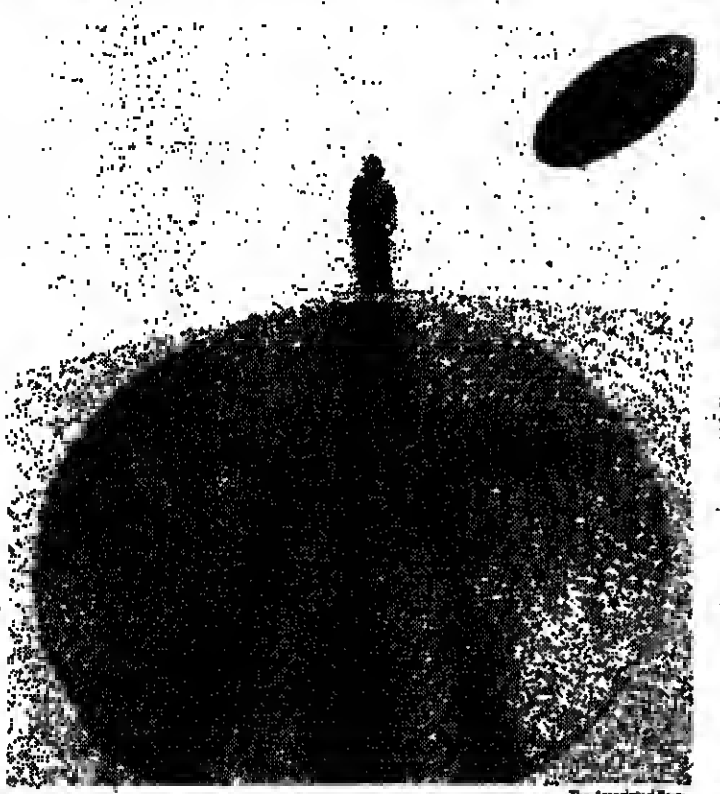
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Nicola Carrino with "Transformation of Space/Ellipses 82."

Italian Hodgepodge

By Max Wykes-Joyce
International Herald Tribune

LONDON — The history of Italian art in this century is a history of manifestos and movements. No sooner do any two artists agree on any particular art or thought, be it never so minute, than they form a *gruppo*, initiate a *manifesto*, and issue a manifesto.

From the 1909 manifesto of the Futurists to the 1947 "Technical Manifesto of Spatialism" of Lucio Fontana, there is virtually an annual statement of intent or asseveration of ideas by one group or another. It is with a cool canvas — "Spatial Concept" — of Fontana that the large exhibition of contemporary Italian art — "Arte Italiana 1960-1982" — begins at the Hayward Gallery, Montreal, as a counterpart for the "English Art Today" exhibition of 1976 in Milan, this show has been organized by the city of Milan, which appointed five Italian art critics to devise the form of the exhibition and select the artists.

Each of the five has contributed an introductory essay to the sumptuous catalog. Unhappily, all five essays are written in critical bloodgoggles ("Plastic theatricality, lucid as a method and an end with ideological and political intentions, irony and the grotesque used as critical indices, quotation as a mark of continuity within non-continuity..." etc., etc.), so that no enlightenment is to be found there as to what principles guided their selection.

The show has been hung in eight sections, chiefly by movements, with sculpture scattered through the galleries by size and context. Fontana's "Spatialismo" opens the show, and is followed by a group of works "from *Azzeramento to Modulazione oggettuale*." The exact meaning of these terms is obscure. In practice the exhibits include shaped monochrome reliefs by Francesco Lo Savio; systems pieces by Dadamonte, and "works" by the preeminent Piero Manzoni (1933-1963), who persuaded people with more money than sense to buy strips of paper with single lines drawn on them, rolled up in cardboard tubes — "Percorsi" — and small tin containers a sample of the "artist's" feces.

Others were on a higher level than Manzoni and his followers. Section 3 has work in the categories "Arte cinetica and Arte programmatica," which includes the masterly "Entredit" of Gianni Colombo, a walk-through piece by means of variably sloping walls, floor and ceiling, sensitized to the walker to "varying states of psycho-physical equilibrium."

The finest work is to be seen in Sections 5, "Oggetto popolare, Immagine" and 6, "Astrazione lirica, and nuove astrazioni." Among the Italian versions of Pop Art are to be seen splendid images by the Valerio Adams, of Bologna, who lives and works in Paris; Enrico Baj, much influenced by the ideas of Alfred Jarry; Mario Ceroli, sculptor and theater designer, represented here by a 3-D contour chart in wood of a human being; elegant constructions by Lucio De Pezzo; and Concetto Pozzati, represented by his multi-image "From the Suicide of Grotz."

In the abstract section, there also are a number of fine artists, notably Carlo Battaglia, with "Ultime Opere," Nicola Carrino with a painting-sculpture piece called "Transformation of Space/Ellipses 2/81," Claudio Olivieri with some lyrical color pieces similar in feeling to Rothko at his best; and Giuseppe Uncini, with subtle architectural reliefs.

"Conceptual Art and Arte povera" is summed up in the word *povertà* — impoverished. The sculpture, too, apart from the work of the Pomodoros, Arnaldo and Giulio, poorly represents what is best in current Italian practice. However, the final section on "new directions" makes honorable amends, particularly with the work of Luigi Mainolfi, who moves with ease between painting and sculpture; the Roman Gianfranco Notargiacomo, who also moves between disciplines; the Florentine painter Luciano Bartolini; and Luigi Ontani, who ranges in imagery from Classical through Renaissance to contemporary plastic with ease and elegance.

Arte Italiana 1960-1982, Hayward Gallery, South Bank, SE1, to Jan. 9.

Some Unusual Paris Gallery Shows

By Michael Gibson
International Herald Tribune

PARIS — The feathers are extraordinarily delicate and they glow with a range of colors that seem to have been borrowed from the rainbow of another sun. A fluorescent aquamarine hue shines, nestled in a cushion of black long blue feathers, arrayed on the wall in a fan formation, surprise one by showing a deep red reverse. There are sumptuous white feather bouquets that look like high fashion hats, peacock-glorious fanlike headresses, minute earrings made of hummingbird feathers, and belts illustrated with a mythological bestiary done in a mosaic of feathers.

All this is the work of Amazonian Indians displayed at the Galerie Urubamba, a remarkable little gallery run by Roberta Rivin, who periodically travels to remote Amazonian regions to collect these extraordinary objects. One is reminded, in looking at the frailty of these pieces, of the pathetic vulnerability of the villagers who made them and who are currently on the road to extinction at the hands of speculators and adventurers.

"Art Indien d'Amazonie," Galerie Urubamba, 4 Rue de la Bucherie, Paris 4, to Nov. 20.



Zuka's playful "Rainmaker" (detail).

Zuka (she doesn't use her last name of Mittelberg), a California-born artist who has been living in Paris for 30 years, has chosen Galois Indians for a theme in much of her recent work. But that is rather incidental because the main interest of Zuka's work is the astonishing ease and playful inventiveness with which she handles her medium. The medium itself is quite surprising since she now works exclusively with wallpaper and its infinite variety of often inimitable patterns.

The delightful aspect of her work is that she gives life to the inanimate, fantasy to the repetitive and the dull, and allows the unpromising material she gleans here and there to achieve an unforeseeable beauty. Her work deals with

two sorts of subject matter, in part devoted to the Indian subjects already mentioned, and in part to birds. The style in either case is different, the Indian work being more vigorous and full of gaudy contrasts while the birds are handled in an idiom closer to the exquisite and delicate manner of Oriental embroidery. Zuka has become a virtuoso with the scissors and her delight in invention is infectious.

Zuka, Galerie Darthea Speyer, 6 Rue Jacques Callot, Paris 6, to Nov. 20.

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Market Summary, Oct. 29

Market Diaries

| NYSE | AMEX | Nas | AMEX |
|--------|-------|-------|-------|
| 31,212 | 3,721 | 3,721 | 3,721 |
| 31,212 | 3,721 | 3,721 | 3,721 |
| 31,212 | 3,721 | 3,721 | 3,721 |

AMEX Most Active

| Symbol | Price | Change |
|-----------|--------|--------|
| Domestic | 100.00 | +0.10 |
| Foreign | 100.00 | +0.10 |
| Commodity | 100.00 | +0.10 |

NYSE Index

| Index | Value | Change |
|-------|--------|--------|
| NYSE | 31,212 | +100 |
| AMEX | 3,721 | +100 |
| Nas | 3,721 | +100 |

NYSE Most Active

| Symbol | Price | Change |
|-----------|--------|--------|
| Domestic | 100.00 | +0.10 |
| Foreign | 100.00 | +0.10 |
| Commodity | 100.00 | +0.10 |

Dow Jones Averages

| Index | Value | Change |
|----------------|-------|--------|
| Dow Jones | 1,234 | +10 |
| Industrial | 1,234 | +10 |
| Transportation | 1,234 | +10 |

Standard & Poor's Index

| Index | Value | Change |
|-------------------|-------|--------|
| Standard & Poor's | 1,234 | +10 |
| Industrial | 1,234 | +10 |
| Transportation | 1,234 | +10 |

Odd-Lot Trading in N.Y.

| Symbol | Price | Change |
|-----------|--------|--------|
| Domestic | 100.00 | +0.10 |
| Foreign | 100.00 | +0.10 |
| Commodity | 100.00 | +0.10 |

Friday's NYSE Closing Prices

Tables include the nationwide prices up to the closing on Wall Street.

| 12 Month | High | Low | Stock | Div. | Yld. | P/E | 100s | High | Low | Stock | Div. | Yld. | P/E | 100s |
|----------|--------|--------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 10 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 14 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 15 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 16 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 17 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 18 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 19 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 20 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 21 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 22 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 23 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 24 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 25 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 26 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 27 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 28 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 29 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 30 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 31 | 100.00 | 100.00 | Domestic | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Aide Says Curbs On Trade Could Ruin EC Market

The Associated Press

CORK, Ireland — Protectionism and government intervention in business are "threatening to break up" the European Community market, Frans Andriessen, the EEC commissioner for competition matters, said today.

Although he spoke of all 10 EEC nations, Mr. Andriessen directed his comments in particular at France.

"In some cases, sealing off the domestic market has even graduated to an article of faith," said Mr. Andriessen in a speech to the Cork Chamber of Commerce. "I'm thinking here of such strategies as the *raisonnée* *de* *la* *main* *d'oeuvre* or recapturing the domestic market in France."

He added that "non-tariff barriers are introduced every day" in the EC to block imports from outside as well as inside the community.

In this respect, Mr. Andriessen said the EC member states "inventiveness knows no limits." He said a new French requirement that all imports bear country-of-origin labels and are accompanied by documents written in French are just two examples.

France also attracted attention recently for ruling that all imports of video recorders must be processed at a small office in Paris, a move seen as designed to obstruct such imports.

In addition, he said, "public-sector intervention in the management of firms is spreading rapidly."

Whether in the form of nationalizations, acquisitions of holdings or straightforward national aid, this growing interventionism is threatening to break up the community market, Mr. Andriessen said. "Instead of strengthening the industrial base, it is undermining it." The intervention thwarts mergers that could increase efficiency among European companies, he said.

ECONOMIC SCENE

By MICHAEL QUINN

Keeping Wall Street Content Will Not Be Easy for the Fed

NEW YORK — The Federal Reserve and the financial markets are enjoying a honeymoon, with falling interest rates and widespread expectations of further declines.

For now, confidence in the Fed is high. Few participants in the financial markets feel that the Fed's tolerance of faster money supply growth has to mean more inflation ahead. They agree with the Fed that money supply growth cannot be gauged if tens of billions of dollars are shifted as banks and savings institutions introduce accounts to compete with money market mutual funds.

How long will the financial markets trust that the Fed's policies will not revive inflation? Investors are still willing to buy Treasury bonds yielding 10 1/2 percent, but that would not continue if inflationary monetary policies were to return.

"Concern about inflation and monetary discipline is not something we can turn on and off," Paul A. Volcker, chairman of the Federal Reserve Board, said recently. "It will be a continuing priority concern of policy."

Confidence in the Fed has grown immensely since Mr. Volcker became chairman in August 1979. The volatility of money supply growth and the economy in the past few years has made Fed watching a fast-growing cottage industry, but the flood of analysis has not obscured the fact that Mr. Volcker has managed to gradually slow the growth of money supply year after year. That is a definite improvement over Mr. Volcker's predecessors, whose talk about fighting inflation was not backed by deeds.

Inflation has subsided faster than expected, which is the main reason for optimism in financial circles that interest rates can safely decline further without touching off another round of higher prices. With Treasury bills at 7 1/2 percent and long-term bonds at 10 1/2 percent, rates are only about a percentage point higher than their 1980 lows. Prices are rising at a 5 or 6 percent rate, compared with the double-digit increase of 1980.

More Room to Maneuver

The Fed has additional leeway to bring interest rates down because the ample amounts of money and manufacturing capacity leave room for economic growth without touching off another round of inflation. Yet another reason for tolerating faster money supply growth is that the growth has been concentrated in accounts that the public uses as a liquid kind of savings.

Without discipline imposed by money supply growth targets, against which its performance can be compared, will the Fed continue to be so successful in gradually reducing money supply growth year after year?

The Humphrey-Hawkins Act requires the Fed to testify twice a year about monetary policy and identify its money supply goals, but this does not guarantee that the goals will be met. Such a guarantee might not be wise, since it would prevent the Fed from responding, as it is now doing, to changes in the financial markets and economy.

In Mr. Volcker's words, the adjustment in the Fed's policy seems likely to endure for a matter of months and is not a permanent rebuke of the principle that control over inflation requires control over growth of the money supply. Proclamations that monetarism is over reflect the judgment of the authors, not the words of Mr. Volcker.

"We face over the next several months not just the possibility but the virtual certainty of 'distortions' in money supply data as the accounts competing with money market funds are introduced by banks and savings institutions," Mr. Volcker said earlier this month. "It is likely to take some months before new relationships can be judged with any degree of reliability," he added. His remarks show he has not abandoned the notion that money supply growth needs to be controlled in light of economic conditions.

Uncertain Prospects

The honeymoon is not over as long as the financial markets still have confidence in the Fed's policies. But the future is likely to be rocky because interest rates cannot continue to decline indefinitely. And as Norman Robertson, chief economist at the Mellon National Bank, said recently, "We have yet to demonstrate that we can have a recovery with price stability."

One of the rocks in the road ahead may be the government's fiscal policy, which has not been in harmony with the Fed's efforts to simultaneously curb inflation and promote economic growth. The \$110-billion deficit in the fiscal year just ended and the prospect of an even larger deficit in the current year will certainly cause rates to be higher than they would be otherwise.

The Fed can go only so far toward sheltering the economy from the burden of the budget deficits. If it goes too far in its efforts to keep interest rates down, it could lay the groundwork for future inflation.

The New York Times

Japan's Trade Surplus Swells but Yen Slides

TOKYO — Japan announced Friday that its trade surplus rose sharply in September, pushing the balance of payments into the black for the first time in four months, while Japan's inflation and unemployment rates remained among the world's lowest.

The yen again weakened against the dollar, however, and touched its lowest level for nearly five and a half years.

The prime minister's office said consumer prices rose 3.2 percent in the 12 months to September, compared with annual inflation of about 5 percent in the United States, 10 percent in France and 17 percent in Italy.

The office also said 1.34 million Japanese were out of work at the end of September, up from 1.3 million at the end of August. That put the jobless rate at 2.3 percent of the work force, compared with 10.1 percent in the United States, 12.7 percent in Britain and 7.5 percent in West Germany. Some analysts say, however, that Japan's jobless rate would be higher if it were calculated using the same methods as those of other major industrial countries.

The Finance Ministry announced that exports exceeded imports by \$2.43 billion in September, compared with \$984 million in August. That helped bring the overall balance of payments back into the black in September with a \$823-million surplus, compared with August's deficit of \$397 million.

For the first half of the year ending next March 31, Japan has chalked up an \$11.05-billion trade surplus, against \$12.23 billion a year before. The balance of payments, however, was in deficit by \$3.45 billion, compared with \$3.2 billion, reflecting investment of funds overseas to take advantage of higher interest rates than those in Japan.

The yen weakened sharply in Tokyo before the figures were released, trading as low as 278.50 to the dollar. The weakening followed a statement by the U.S. treasury secretary, Donald T. Regan, that the United States has no plans to enter the foreign exchange

markets to support the yen. The Japanese currency later firmed slightly to close at 277.40.

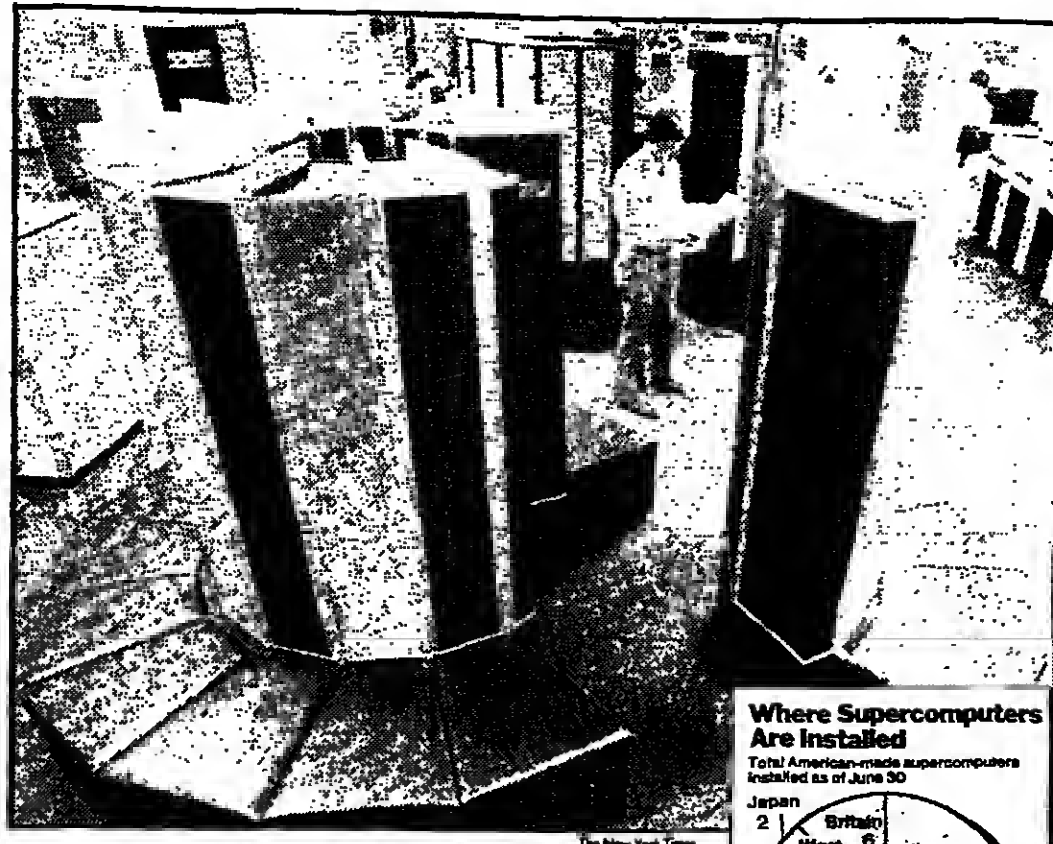
The Japanese cabinet met Friday and forecast that the gross national product would grow 3.4 percent in the year ending next March, down from the 5.2 percent expected at the beginning of the year. In the year ended last March, GNP rose 2.7 percent.

The cabinet also endorsed a draft supplementary budget for the current financial year that, with parliamentary approval, would allow the government to borrow 3.9 trillion yen (\$14 billion) more than the 10.44 trillion yen it had already decided to raise through bond issues this year.

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A supercomputer made by Cray Research.

Japan Inc. Tackles The Supercomputer

By Andrew Pollack

The New York Times Service

NEW YORK — Japanese computer manufacturers, with the aid of their government, are moving ahead in an ambitious effort to surpass U.S. companies in building high-speed computers, according to officials, industry and university scientists in the United States.

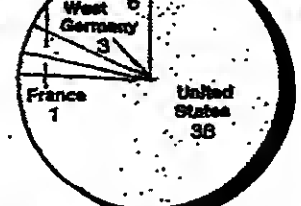
The rapid Japanese advance has raised the possibility that the United States could become dependent on a foreign supplier for so-called supercomputers, which are used in weapons development and many other research applications. The situation is likely to spark renewed debate within the United States about the proper American response to Japanese industrial efforts.

A panel of U.S. computer scientists, in a report that will soon be made public, is urging that the government undertake a national program to spur development of such supercomputers. Such a program would be one of the first in which the government, industry and universities collaborate to counter Japanese moves, which are seen as having been so successful in part because of close cooperation between business and government in Japan.

"The argument is that in absence of a coordinated government effort, (Continued on Page 15, Col. 5)

Where Supercomputers Are Installed

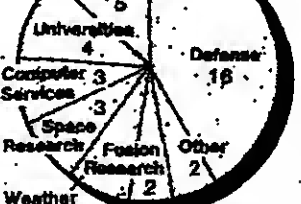
Total American-made supercomputers installed as of June 30



Note: 35 supercomputers were sold by Cray Research, 14 by Control Data, and 1 by Denelcor Inc.

How Supercomputers Are Used in the U.S.

A breakdown of the June 30 total of 38 supercomputers installed in the United States



Source: Lex Committee Report

U.S. Leading Indicators Up 0.5% in September

WASHINGTON — The government's index of leading indicators climbed 0.5 percent in September on the strength of soaring stock prices and increased building permits, the Commerce Department said Friday. It was the fifth improvement in six months.

The month's increase had been assured even since investors drove up stock prices in a continuation of a record buying spree last month, overwhelming the deterioration in employment statistics also included in the composite index.

The department also said later data for inventories made August's decline far less than the 0.9 percent originally reported, turning it into a 0.2 percent drop.

The index, designed to anticipate economic trends from one to six months ahead of time, has gone up a total of 4.2 percent since March, suggesting an economic recovery may be on the way, government analysts said.

A spokesman for the department's Bureau of Economic Analysis, Larry Moran, said, "In all past World War II recessions, when the index has gone up 2 percent or more recovery has followed shortly."

Five of the 10 indicators available for September were up, four declined and one remained the same, the department said.

The five indicators that increased in September were led by a jump in the prices of 500 common stocks. Increased building permits, a sign of probable construction activity in the near future, was the next largest contributor, the department said.

Also up, by far smaller margins, were orders for factory equipment

and for consumer goods, adjusted for inflation, as well as the money supply.

The four negative indicators were a decline in the length of the average work week and an increase in the number of claims for unemployment insurance, lower prices of raw materials, which suggest an economic slowdown when they go down, and a change in total liquid assets.

Unchanged for the month was the pace of deliveries, which slows when demand goes up.

An accompanying index of coincident indicators designed to be a measure of current economic performance went down 0.8 percent,

showing that the improvement suggested by the leading index has not yet taken hold.

The Conference Board said Friday that the indexes of leading indicators in the United States and Japan have declined in recent months while those of the United Kingdom and West Germany have posted gains.

Compiled for the Conference Board by the Center for International Business Cycle Research at Rutgers University, the indexes are based on 65 indicators that anticipate changes in national output or employment. Stock prices, corporate profits, new orders, construction, and changes in consumer

change markets France will introduce a two-tier currency system were out of the picture.

Foreign exchange dealers said the rumors, which first developed some weeks ago, revived Friday ahead of the four-day All Saints Day weekend. The dealers said the rumors had no significant impact on the franc.

In Milan, the dollar reached 1,461.25 Italian lire in Milan, up from 1,459.70.

Foreign exchange dealers have ascribed the dollar's recent strength mainly to expectations that U.S. interest rates will remain little changed prior to Tuesday's congressional elections.

When interest rates are higher in the United States than elsewhere,

Fed Economic Forecast Sees 2% Growth in '83

The Associated Press

WASHINGTON — The Federal Reserve Board is gloomier than the Reagan administration and most leading private economists about prospects for a moderate economic recovery and declining unemployment next year, according to a confidential forecast.

Government sources say an economic outlook prepared in early October for the board of governors of the central bank, independent of the White House, predicts the economy will expand at a slow rate in 1983, with unemployment remaining in the 10 percent range.

The forecast, which was leaked late Thursday and which depressed prices on the New York Stock Exchange early Friday, suggested that the economy will grow only about 2 percent over the next 12 months, after adjusting for inflation, according to the sources.

The Federal Reserve's tight money and credit policies for fighting inflation have been held responsible by most economists for driving up interest rates, which subsequently triggered the recession that began last summer.

The new internal forecast indicates that slow economic growth and high unemployment remain as unavoidable tradeoffs for keeping inflation low so that interest rates will continue coming down.

By one common economic rule of thumb, the economy has to grow 3 percent a year just to keep unemployment from rising further.

In contrast to the central bank's outlook, the Reagan administration and a consensus of 42 private economic forecasters expects the economy to grow at an annual rate of 3 percent to 4 percent next year — just enough to bring unemployment below the double-digit mark — but not by much.

The jobsless rate in September reached a 42-year high of 10.1 percent, and many economists expect it to hit 10.5 percent soon.

On Thursday, Treasury Secretary Donald T. Regan said he still expects the economy to grow be-

tween 3.5 percent and 4 percent next year. He declined, however, to predict whether unemployment would rise further.

Of late, administration officials and private economists have become more optimistic about the prospects for a sustained recovery because of the recent slide in interest rates, which they attribute to an easing of credit conditions by the central bank.

But the lower interest rates have not made bank officials so bullish. "We didn't have an optimistic forecast," said one senior official at the Fed. The official, who did

not want to be quoted by name, added: "It's hard to see a decline in unemployment."

But a congressional economist familiar with the bank's forecast argued that the Federal Reserve may be a little off the mark.

"The Fed's forecast is gloomy because they're talking to the wrong people," said the economist, who also did not want to be identified. He contended that the bank's survey of business conditions overlooked brightening developments in housing, autos and retailing that suggest a much stronger recovery in 1983.

N.Y. Stock Prices Close Up Slightly

Compiled by Our Staff From Dispatches

NEW YORK — Prices on the New York Stock Exchange closed slightly higher and volume remained relatively light Friday as investors moved away from the market ahead of next week's elections.

The Dow Jones industrial average was off about 2 1/2 points most of the afternoon but pulled up in late trading to close with a gain of 0.82 at 991.81. Advances edged out declines by a margin of about 30 issues, and volume inched up to 74.8 million shares from 73.6 million traded Thursday.

Thursday and Friday saw the highest trading activity in three weeks. Turnover was more than 100 million shares a total of 10 days in October.

The block trading desk at one brokerage firm reported that "activity was mixed" and described the attitude of pension funds and other large investors as "jittery."

John R. Groom of the United States Trust Co. said that "the market is taking a pause here and you must not see a pullback after its meteoric rise on heavy volume." That rise, touched off in mid-August by plummeting interest rates, saw the Dow climb 260 points, or 33.5 percent, in 10 weeks.

The Dow average fell almost eight points in the first hour of trading as the market continued to react to a gloomy economic forecast prepared by the Federal Reserve Board staff in early October.

Word of the report caused the market to sell off sharply late Thursday and this morning it overcame news of the increase

U.S. M-1 Declines By \$700 Million

By Reuters

NEW YORK — The basic measure of the U.S. money supply, M-1, fell \$700 million to a seasonally adjusted \$467.7 billion in the week ended Oct. 20, the Federal Reserve reported Friday. The drop was slightly deeper than most forecasts.

The previous week's M-1 figure was revised to \$468.4 billion from \$468.3 billion. Over the past four weeks, M-1 has averaged \$464.9 billion compared with \$460.1 billion a week earlier and was 13.2 percent above that for the preceding 13 weeks.

In the index of leading economic indicators for September, analysts noted the benefit of an increase in the leading indicators for September was undercut by projections that the index will fall again in October.

Analysts said investors are also nervous about the outcome of Tuesday's elections, which could result in the loss of Republican seats in Congress.

On the NYSE floor, auto stocks were among the most active.

Chrysler gained 1 to 10 1/2 on volume of 1.2 million shares, while General Motors gained 2 to 5 1/2 on volume of just over 1 million shares.

Stearns Drug was again the most active issue, shedding 1 to 2 1/2 after a large drop Thursday.

CURRENCY RATES

Interbank exchange rates for Oct. 29, excluding bank service charges.

| | \$ | £ | D.M. | F.F. | It.L. | Sw.F. | S.P. | S.F. | D.C. |
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| Brussels (a) | 49.56 | 83.115 | 17.318 | 6.486 | 3.276 | 17.888 | — | 22.41 | 5.925 |
| Frankfurt | 3.5433 | 4.294 | 16.37 | 16.37 | 8.1975 | — | — | — | — |
| London (b) | 1.677 | — | — | 12.148 | 48.25 | 4.653 | 82.94 | 2.702 | 15.23 |
| Paris | 1.4785 | 2.4620 | — | 27.20 | — | — | — | — | — |
| New York | — | 1.071 | 0.709 | 0.183 | 0.048 | 0.239 | 0.020 | 0.052 | 0.111 |
| Porto | — | — | — | — | — | — | — | — | — |
| Zurich | 2.7125 | 2.7965 | 16.365 | 16.365 | 8.1975 | — | — | — | — |
| 1 ECU | 0.1718 | 0.5478 | 2.552 | 6.482 | 13.426 | 5.552 | 45.479 | 2.279 | 3.849 |
| 1 SDR | 1.6237 | 0.6767 | 2.729 | 7.702 | 16.4 | 2.992 | 52.74 | 2.534 | 9.574 |

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(a) Commercial bank. (b) Amounts needed to buy one pound. (c) Units of 100. (d) Units of 1000.

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... if you participate in the Süddeutsche Klassenlotterie. This government-controlled West German lottery has now a maximum jackpot of 1 1/2 million DM waiting for the lucky winner. Only 500,000 tickets participate in drawings starting on November 13th 1982 and lasting until May 1983. 241,598 numbers will win one of these prizes.

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4 x 1 Million
12 x 500,000 DM
8 x 250,000 DM

24 x 100,000 DM
12 x 50,000 DM
and over 241,500 other prizes ranging from 120 DM to 60,000 DM

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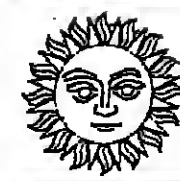
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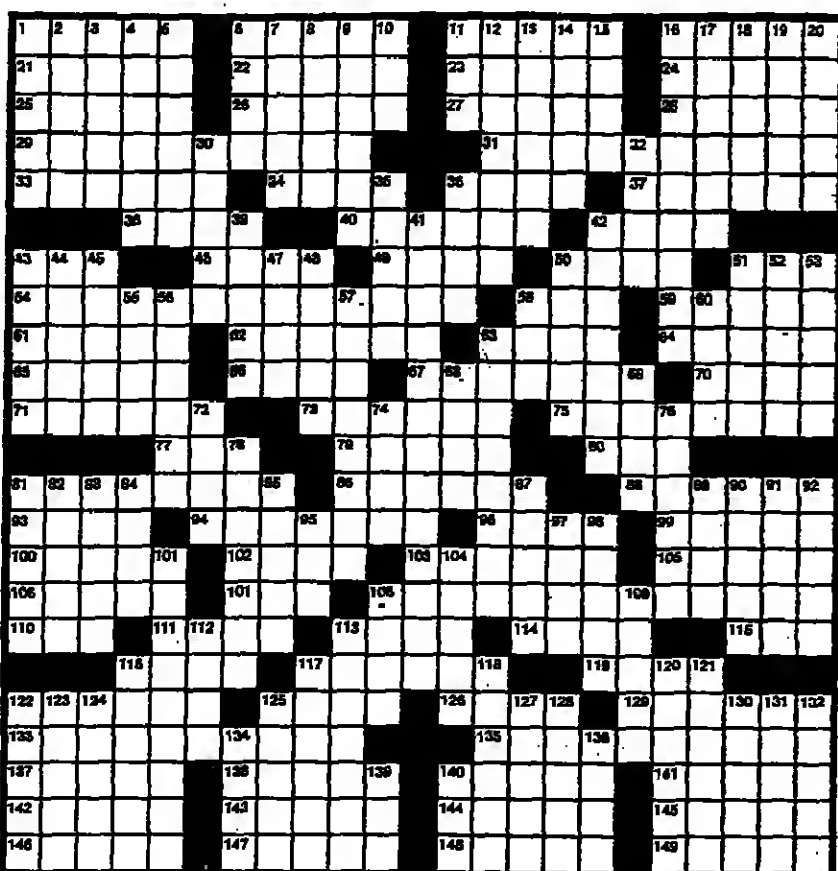
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CROSSWORD PUZZLE

Halloween Party By John M. Samson



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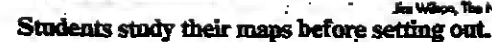
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People to Vote For

Broadway 'Annie' to Close
The Associated Press
NEW YORK — "Annie," the hit Broadway musical based on the famed cartoon orphan, finally is closing, its 2,377th and last performance scheduled for Jan. 2, a spokesman for the show said.

AS FOR the various propositions on the ballot: We favor all the odd-numbered ones and are against the even ones, with the exception of Proposition 82, which reads, "The people of this state believe that in the event of a nuclear attack no alternate parking will be permitted at ground zero."

Orienteering is a sport in 27 nations, a recreation second only to soccer in Scandinavia. The 1985 world championships will be in Australia. U.S. competitors are orienteering in canoes and sailboats, on



"I'm not going to lose my mom and dad," said Jason Webster, an

One, Caroline King, happily obliged. Said she: "It's better to have loved and been lost than never to have orienteered at all."

Pamela Osarak made English legal history by winning damages for "canot elbow." A High Court

Speaking at the dedication of a new college to help promote world peace, Prince Charles of Britain criticized governments "based on greed, selfishness and official lies." He said that peace is more elusive by totalitarian regimes that force people to live in systems that end up "crush human relationships. They mobilize huge resources, but cannot actually 'crush' millions." His speech capped decades of criticism by the "Arms Hater" of the United States, the American West in Moscow, New Mexico, the sixth in the United World College system and first in the United States. The prince are in Wales, British Columbia; Singapore; Swaziland and India. Funded by the oil magnate named Hammer, the school's first class has an enrollment of 102 students from 46 nations. The United World College is a unique curriculum equivalent to the first year of high school and the first year of college. It focuses on history, art and man's search for knowledge. Charles and Hammer contribute to the late Lord Lee Mounbatten, the prince's grandfather, who was the driving force behind the United World College movement. Mounbatten was killed by Irish terrorists in a 1982 explosion in August in London. The United World College is the system's international college of the future. The prince is the driving force.

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